

RF11

DATA TEST
MD-11-DZRFB-B

EP-DZRFB-B-DL
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FICHE 1 OF 1

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digital
MADE IN USA

The microfiche card contains 48 frames of data, organized in 8 rows and 6 columns. The data is as follows:

Row	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
1	Diagram	Table	Table	Table	Table	Table
2	Table	Table	Table	Table	Table	Table
3	Table	Table	Table	Table	Table	Table
4	Table	Table	Table	Table	Table	Table
5	Table	Table	Table	Table	Table	Table
6	Table	Table	Table	Table	Table	Table
7	Table	Table	Table	Table	Table	Table
8	Table	Table	Table	Table	Table	Table

IDENTIFICATION
.....

PRODUCT CODE: MAINDEC-11-DZPFR-B-D

PRODUCT NAME: PF11 DATA TEST

DATE CREATED: SEPTEMBER, 1973

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: EAPL HAIGHT/C CASHELL

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1. ABSTRACT

THE PF11 DISK DATA TEST IS A SERIES OF STATIC, ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THE DISK CONTROL (RF11) AND DISK (RS11) ARE OPERATING CORRECTLY. THIS TEST USED IN CONJUNCTION WITH THE RF11 DISKLESS AND PF11 MULTI DISK ASSURES THE USER OF AN ERROR FREE SYSTEM, WHEN USED IN ITS ENTIRETY.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11
RF11 AND RS11

2.2 STORAGE

DATA TEST
MAIN BODY OF PROGRAM OCCUPIES ALL OF MEMORY (MINIMUM
REQUIRES 4K WORDS) THE WRITE AND READ BUFFERS FLOAT THRU
MEMORY.

3. LOADING PROCEDURE

3.1 METHOD OF LOADING BOTH STATIC AND DATA TEST TAPES

PROGRAM FORMAT ABSOLUTE

A. VERIFY THE BOOT LOADER IS IN MEMORY.

B. SET SWITCH REGISTER EQUAL TO *500

MEMORY SIZE *

4K	17
8K	37
12K	57
16K	77
20K	117
24K	137
28K	157

C. DEPRESS LOAD ADDRESS.

D. DEPRESS START.

4. STARTING PROCEDURE

4.1 WORST CASE DISK TEST

- A) SET SWITCH REGISTER EQUAL TO 200
- B) DEPRESS LOAD ADDRESS
- C) SET SWITCH REGISTER EQUAL TO ZERO
- D) DEPRESS START

4.2 OPERATOR INTERVENTION FOR DATA TEST ONLY.

- A) SET SWITCH REGISTER EQUAL TO 200
- B) DEPRESS LOAD ADDRESS
- C) SET SWITCH REGISTER EQUAL TO MODE OF OPERATION (REF. SECS.)
- D) DEPRESS START.

4.3 ADDRESS ENTRY POINTS FOR TEST ROUTINES

600	JMP	ADT2	CHECK THAT WHEN A WORD IS WRITTEN IT DOES NOT ALTER ADJACENT WORDS
604	JMP	ADT3	WRITE EACH WORD ADDR ON ITSELF AND READ BACK TO COMPARE
610	JMP	ADT4	TRACK SELECTION TEST
614	JMP	ADT5	LOOK AHEAD TEST
620	JMP	SPIRAL	SPIRAL TEST
624	JMP	XSPIRAL	SPIRAL TEST EXTENSION
630	JMP	RANEX	RANDOM ADDRESS, DATA AND WORD COUNT TEST
634	JMP	EXTMEN	DISK EXT. MEMORY EXERCISER
640	JMP	PFT1	DISK WRITE POWER FAIL TEST
644	JMP	PFT2	DISK WRITE CHECK POWER FAIL TEST

(4.3 CONT'D)

MAINTENANCE ROUTINES

650	JMP	SELWC	LOAD WORD COUNT REG. WITH SWITCH REGISTER
654	JMP	SELMA	LOAD CURRENT MEMORY ADDR REG. WITH SWITCH REGISTER
660	JMP	SELDAF	LOAD DISK ADDR. REGISTER WITH SWITCH REGISTER
664	JMP	SELDAE	LOAD DISK ADDR. EXT. WITH SWITCH REGISTER
670	JMP	SELDBR	LOAD DATA BUFFER REGISTER WITH SWITCH REGISTER
674	JMP	MOVLR	MOVE CONTENTS OF LOOK AHEAD REGISTER INTO DATA LIGHTS
700	JMP	SELDCS	LOAD DISK CONTROL REGISTER WITH SWITCH REGISTER
704	JMP	STAMP	ENABLE HEAD AMPLIFIERS TO TRACK SELECTED

5. OPERATING PROCEDURE

5.1 CONTROL SWITCH SETTINGS

PROGRAM CONVERSATION •

SR15	SET	ENTER PROGRAM CONVERSATION MODE REF. SEC. 5.2
	RESET	OPERATE WORSE CASE TEST ON ALL DRIVES BEGINNING AT DRIVE ZERO

DELETE TYPEOUT

SR14	SET	DELETE TYPEOUTS
	RESET	REPORT MESSAGE

HALT ON COMPLETION FLAG •

(5.1 CONT'D)

SR13 SET HALT ON FLAG (READY)
RESET EXECUTE NEXT OPERATION

DELETE COMPARISONS *

SR12 SET DELETE DATA COMPARISONS
RESET COMPARE DATA BUFFERS

LOOP ON TEST

SR11 SET LOOP ON TEST
RESET CONTINUE TO NEXT TEST
HALT ON ERROR

SR10 SET HALT AFTER ERROR REPORT
RESET CONTINUE AFTER ERROR REPORT
ENTER INTERRUPT BACKGROUND TEST *

SR9 SET WAIT FOR INTERRUPTS USING WAIT INSTRUCTION
RESET WAIT FOR INTERRUPTS WITH BACKGROUND TEST

LOOP ON DISK ADDRESS *

SR8 SET LOOP ON DISK ADDRESS (SPECIFIED BY WORD COUNT AND DAR)
RESET CONTINUE TO NEXT DISK BUFFER AREA.

SELECT TRACK FROM SR (DURING DYNAMIC TESTING)

SR7 SET SELECT TRACK FROM SR
RESET SELECT TRACK UNDER PROGRAM CONTROL
TRACK SELECTION

6 5 4 3 2 1 0

SELECT ONE OF 177(R) TRACKS

NOTE:

* SWITCH SETTING APPLICABLE ONLY IN DATA TEST

5.2 CONVERSATION MODE FOR PROGRAM PARAMETERS FOR DATA TEST ONLY

IN THE PROGRAM CONVERSATION MODE THE OPERATOR CAN SPECIFY ANY ONE OR ALL OF THE PROGRAM PARAMETERS.

PROGRAM CONVERSATION

DATA TEST ONLY?

IF THE OPERATOR ANSWER YES THE PROGRAM WILL ENTER ONLY THE DATA PORTION OF TEST.

MULTI DK MODE?

MULTI DISK MODE IS A MODE IN THE PROGRAM WHICH ALLOWS THE OPERATOR TO EXERCISE, ALL THE DISKS ON THE SYSTEM WITHOUT RE-STARTING THE PROGRAM. THE PROGRAM AFTER EXERCISING ONE DISK WILL REPORT A MESSAGE TELLING THE OPERATOR WHICH DISK WILL BE SELECTED NEXT, AND THEN THE PROGRAM WILL EXERCISE THAT DISK. WHEN A COMPLETE PASS IS ACCOMPLISHED, A PASS COMPLETE WILL BE REPORTED AND THE TEST WILL RECYCLE.

IF THE OPERATOR ANSWERS "YES" TO THIS QUESTION, HE WILL THEN BE ASKED HOW MANY DISKS ARE ON THE SYSTEM, AND THEN THE PRECEDING QUESTION WILL BE SKIPPED. IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION, THE NEXT QUESTION WILL BE SKIPPED, AND HE WILL THEN BE ASKED WHICH DISK IS TO BE EXERCISED.

OF DKS 1 TO 10 OCTAL? X

TYPE THE NUMBER OF DISKS ON THE SYSTEM, FOR MULTI DISK MODE.

EX. DK? X

WHEN NOT IN THE MULTI DISK MODE THE OPERATOR WILL HAVE TO SPECIFY WHAT DISK IS TO BE USED.

OPT. WRD CNT?

IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION THE NEXT TWO QUESTIONS WILL BE DELETED FROM THE CONVERSATION.

LENGTH (1 TO 1000)? XXX

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO 1000(8) WORDS. THE NORMAL TRANSFER LENGTH IS N(8) WORDS WHERE N IS THE MAXIMUM BUFFER SIZE FOR THE AVAILABLE CORE.

WRD ADDR? XXXX

THE OPERATOR MUST NOW SPECIFY THE STARTING WORD ADDRESS-THIS BEING ONE OF 2048(10). ADDRESS ENTRY MUST BE MADE IN OCTAL (0 TO 3777(8)).

(5.2 CONT'D)

OPT. DATA PAT. #?

IF NO OPTIONAL DATA PATTERN IS REQUESTED THE PROGRAM WILL
EXECUTE THE FOLLOWING LIST OF DATA PATTERNS.

PATTERN	0	=	000000
"	1	=	177777
"	2	=	134510
"	3	=	043267
"	4	=	100000
"	5	=	107070
"	6	=	070707
"	7	=	052525
"	10	=	125252
"	11	=	177737
"	12	=	004102
"	13	=	136363
"	14	=	063636
"	15	=	000001
"	16	=	100005
"	17	=	000520
"	20	=	030303
"	21	=	RANDOM DATA
"	22	=	RUN ALL DATA PATTERNS UNDER PROGRAM CONTROL

IF THE OPERATOR DECIDES TO OPERATE UNDER PROGRAM CONTROL,
THE NEXT QUESTION WILL BE SKIPPED. THE OPERATOR BY
REQUESTING AN OPTIONAL DATA PATTERN HAS THE ABILITY OF
SELECTING ANY ONE OF THE 21(8) DATA PATTERNS. DATA PATTERN
NO. XX

DISK PROGRAM FUNCTION PARAMETERS

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE,
THE OPERATOR CAN SELECT ANYONE OR ALL THREE OF THE CONTROL
FUNCTIONS TO BE EXECUTED. THE NORMAL SEQUENCE OF DISK
FUNCTIONS UNDER PROGRAM CONTROL IS WRITE, WRITE CHECK, AND
THEN READ. BY ENTERING THE CONVERSATION MODE THE OPERATOR
HAS GAINED COMPLETE CONTROL OVER THE DISK FUNCTIONS. HE
MUST SPECIFY YES OR NO TO ALL OF THE FOLLOWING QUESTIONS.

WRITE?	(YES - NO)
WRITE CHECK?	(YES - NO)
READ?	(YES - NO)

(5.2 CONT'D)

TO PERFORM A WRITE CHECK ONLY, THE OPERATOR MUST FIRST WRITE SOME KNOWN DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.

- IF AN ERROR OCCURS IN THE LINE THE OPERATOR IS TYPING, DEPRESS THE RUB-OUT. THIS CAUSES THE QUESTION TO BE RETYPED AND ALLOWS THE OPERATOR TO PROPERLY ANSWER THE QUESTION.

- INDICATES TO THE OPERATOR THAT THE CARRIAGE-RETURN SHOULD BE TYPED AT THE INDICATED PLACE TO TERMINATE THE LINE OF TYPED CHARACTERS.

5.3 SUBROUTINE ABSTRACTS

ADT2 - TEST FOR ALTERATION OF WORD ADDRESS

IN THIS ADDRESS TEST, TRACK ZERO IS LOADED WITH ALL ONES IN BLOCK OF 2K. THEN THE TEST STARTING WITH ADDRESS 0 AND PROGRESSING UP THROUGH AND INCLUDING ADDRESS 3777(8), THE OCTAL VALUE OF THE ADDRESS, IS WRITTEN ON ITSELF AND ALL OTHER ADDRESSES ARE CHECKED FOR MODIFICATION. THEY SHOULD EQUAL ALL ONES. AFTER CHECK IS COMPLETED AND ALL ERRORS ARE REPORTED IF ANY, THE ROUTINE THEN RE-WRITES THE ADDRESS WITH ALL ONES AND THEN CONTINUES ON WITH THE NEXT ADDRESS.

ADT3 - VERIFY THAT ALL ADDRESSES EXIST ON DISK SURFACE TRACK

IN THIS ROUTINE THE OCTAL VALUE OF EACH ADDRESS IS WRITTEN ON ITSELF IN 2K WORD BLOCKS. THE ROUTINE THEN READS THE DISK AND VERIFIES THAT ALL ADDRESSES CAN BE ACCESSED. ERRORS MAY BE REPORTED IN THIS TEST WHICH ARE NOT ADDRESS ERRORS BUT DATA ERRORS. THE OPERATOR IS CAUTIONED TO CAREFULLY EXAMINE THE ERRORS TO DISTINGUISH BETWEEN THE ADDRESS AND DATA ERRORS.

ADT4 - TEST TRACK "X" AND "Y" MATRIX

THIS ROUTINE WAS DESIGNED TO ENABLE THE OPERATOR AN EASY AND SURE METHOD OF DETECTING DEFECTIVE MATRIX SWITCHES. IN THIS ROUTINE THE FIRST AND LAST LOCATION OF EACH TRACK (0 AND 3777(8)) ARE WRITTEN WITH ALL ONES. AFTER THE INITIAL WRITE HAS TAKEN PLACE, THE ROUTINE THEN STARTS WITH THE FIRST WORD OF THE ABOVE INDICATED LOCATION AND WRITES THE ADDRESS ON ITSELF. THE NEXT STEP OF THE ROUTINE IS TO CHECK ALL OTHER ADDRESSES TO SEE IF THEY HAVE BEEN ALTERED. AFTER ALL ERRORS HAVE BEEN REPORTED, IF ANY, THE ROUTINE RE-WRITES THE ADDRESS WITH ALL ONES AND CONTINUES ON WITH THE NEXT ADDRESS.

(5.3 CONT'D)

ADTS - TEST LOOK AHEAD FEATURE

THE DISK LOOK AHEAD FEATURE WAS DESIGNED FOR THE USER WHO WANTED OPTIMUM USE OF THE DISK, BY KNOWING AT WHAT ADDRESS THE DISK READ HEADS ARE LOCATED AT ALL TIMES. THE ADDRESS LOADED INTO THE ADS REGISTER IS THE PHYSICAL ADDRESS OF THE DISK. THE PROGRAM LOCATES THE PHYSICAL ADDRESS BY WRITE A WORD AND UPON RECEIVING THE COMPLETION FLAG THE PROGRAM READS THE ADS REGISTER. THE ADDRESS MAY BE UP TO 2 ADDRESSES OFF.

SPIRAL - TEST DISK TRACK SPIRAL

IN THIS ROUTINE THE ABILITY OF THE CONTROL (RF09/15) TO SPIRAL FROM ONE TRACK TO ANOTHER DURING A READ AND A WRITE. IN ORDER TO CHECK THE READ SPIRAL, THE LAST ADDRESS (3777(8)) OF TRACK ZERO IS WRITTEN WITH PRE-DETERMINED DATA AND THE FIRST ADDRESS (0) OF TRACK ONE, IS ALSO WRITTEN WITH PRE-DETERMINED DATA. THEN A TWO WORD READ STARTING AT LOCATION 3777(8) OF TRACK ZERO IS ACCOMPLISHED. THE TWO WORDS THEN ARE COMPARED TO THE DATA WRITTEN AND ANY ERRORS ARE REPORTED.

TO CHECK WRITE SPIRAL, THE ROUTINE WRITES TWO WORDS STARTING AT ADDRESS 3777(8) OF TRACK ZERO AND TERMINATES AT LOCATION 0 OF TRACK ONE. THE ROUTINE THEN READS THE TWO LOCATIONS WITH ONE WORD TRANSFERS, AND VERIFIES THE CORRECT DATA WAS STORED IN EACH LOCATION.

DATA TESTS

RANEX - RANDOM DATA, RANDOM ADDRESS RANDOM WORD COUNT TEST

THIS ROUTINE TESTS THE ABILITY OF THE SYSTEM TO ACCESS RANDOM ADDRESS WITH RANDOM DATA AND AN INCREMENTAL WORD COUNT. THE DATA IS FIRST WRITTEN ON THE DISK AND THEN DATA IS WRITE-CHECKED. ALL ERRORS ARE REPORTED. THE WORD COUNT RUNS FROM 1 TO 1000(8) WORDS.

DATA RELIABILITY - DATA PATTERN TEST

IN THIS PORTION OF THE TEST, THE ABILITY OF THE COMPLETE DISK SURFACE TO WRITE, WRITE-CHECK, AND READ DATA IS TESTED. THE ROUTINE FIRST WRITES THE COMPLETE SURFACE WITH A SET DATA PATTERN. THEN A WRITE CHECK OF THE COMPLETE SURFACE IS ACCOMPLISHED, THUS REPORTING ALL ERRORS BETWEEN THE DATA WRITTEN AND THE DATA IN MEMORY. THREE HEADS ARE ACCOMPLISHED FOR EACH BUFFER AREA ON THE DISK. THE OPERATOR AT THIS POINT HAS SEVERAL OPTIONS AS TO WHAT COURSE OF ACTION THE PROGRAM WILL TAKE NEXT. (REF. SEC. 5.1)

(5.3 CONT'D)

IN THE DATA RELIABILITY, ALL PROGRAM PARAMETERS CAN BE CHANGED.
REF. SEC. 5.2

MAINTENANCE TOOL

STAMP - STATIC TRACK SELECTION

THIS ROUTINE WAS DESIGNED TO ENABLE THE OPERATOR TO HAVE A QUICK
METHOD OF SELECTING TRACKS FOR AMPLITUDE ADJUSTMENTS.

STAMP - OPERATING PROCEDURE

STEP A. SET SWITCH REGISTER EQUAL TO 704

STEP B. DEPRESS LOAD ADDRESS

STEP C. SET SWITCH REGISTER 9 THRU 7 EQUAL TO DISK 60 THRU 7

STEP D. DEPRESS START

STEP E. SET SWITCH REGISTER 6 THRU 0 EQUAL TO TRACK #

STEP F. DEPRESS CONTINUE

6 5 4 3 2 1 0

TRACK NUMBER
(0 THRU 177(8))

STEP G. TRACK NUMBER CAN BE CHANGED ARBITRARILY.

6. ERROR REPORTS

6.1 ADDRESS ERROR

XX EPR CNT XXXXXXWRD1XXXXWRD2

EPRCNT = IS THE TAG FOR THE LISTING

WRD1 = WHAT WAS EXPECTED

WRD2 = WHAT WAS RECEIVED

WHEN A REPORT ONLY CONTAINS ONE WORD THE PROGRAM WAS EXPECTING
ZEROS BUT RECEIVED WHAT WAS REPORTED.

6.2 ERROR REPORTS

STATUS ERROR

STATUS ERROR XXDAE XXXXXYDAR XXXXXDCS

A B C

A=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS.
B=THE DISK ADDRESS REGISTER
C=THE DISK CONTROL REGISTER

LAYOUT OF DISK ADDRESS BITS

DAE DAR
XXX XXX XXX XXX XXX XXX XXX

DISK NO. TRACK ADDRESS WORD ADDRESS

BIT LAYOUT OF DCS REGISTER

BIT15= ERROR
BIT14= DISK FREEZE
BIT13= WRITE CHECK ERROR
BIT12= DATA PARITY ERROR
BIT11= NON-EXISTENT DISK
BIT10= WRITE LOCKOUT
BIT9= MISSED TRANSFER
BIT8= DISK CLEAR
BIT7= READY
BIT6= INTERRUPT ENABLE
BIT5= EXTENDED MEMORY 1 (XM1)
BIT4= EXTENDED MEMORY 0 (XM0)
BIT3= MAINTENANCE
BIT2-1= FUNCTION REGISTER

BIT 2	BIT 1	OPERATION
0	0	NOP
1	0	READ
0	1	WRITE
1	1	WRITE CHECK

IF THE ERROR OCCURRED WHEN READING THE PROGRAM WILL REPORT WHICH READ.

(6.2 CONT'D)

NOTE: WHEN A FREEZE ERROR OCCURS AN ADDITIONAL ERROR MESSAGE WILL BE REPORTED, AS FOLLOWS:

XXX WRD ERR

LAYOUT OF BITS 0 - 7

BIT0= CHA INH. (NOT AN ERROR CONDITION)
BIT1= UNUSED
BIT2= NON-EXISTENT MEMORY ERROR
BIT3= UNUSED
BIT4= TRACK C TIMING ERROR
BIT5= TRACK B TIMING ERROR
BIT6= TRACK A TIMING ERROR
BIT7= ADDRESS PARITY ERROR

6.3 DATA ERRORS

DATA ERR 1 READ XXDAE XXXXXDAR XXXXXGL DATA XXXXXRD DATA

A B C D E

A=WHICH READ THE ERROR OCCURRED
B=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS
C=THE DISK ADDRESS REGISTER
D=THE DATA WRITTEN ON THE DISK
E=THE DATA READ FROM THE DISK

6.4 PANEX ERRORS

ERRORS WHICH OCCUR IN PANEX ALSO HAVE THE WORD COUNT REPORT WITH THE ERROR MESSAGE IN THE FOLLOWING MANNER.

PANEX ERR XXDAE XXXXXDAR XXXWRD CNT.

A B C

A=STARTING DAE OF TRANSFER
B=STARTING DAR OF TRANSFER
C=WORD COUNT OF TRANSFER

6.5 OVERFLOW ERROR

WHEN THE DISK TRANSFERS MORE WORDS THEN ITS WORD COUNT WAS EQUAL TO, THE PROGRAM FLAGS IT.

FXTRA BKS XXXXXX WRD ADDR XXXXXX BD DATA

A B

A=THE LOCATION IN MEMORY WHERE THE DATA WAS TRANSFERRED
B=THE DATA THAT WAS TRANSFERRED

6.6 DISK ADDRESS ERROR

OK ADDR ERR XXDAFXXXXXXDAH

THE TERMINATING DISK ADDRESS AFTER THE TRANSFER WAS NOT CORRECT
THE DAE AND DAP SHOULD EQUAL WHAT WAS REPORTED. CHECK THE WF11
PANEL FOR THE ERROR ADDRESS.

6.7 PROCESSOR TIME OUT

CPU HGRND TIMED OUT

THIS MESSAGE WILL BE REPORTED IF THE DISK FAILS TO RAISE A
RR REQUEST AFTER EXTENDED PERIOD OF TIME.

6.8 END

END

THIS MESSAGE IS REPORTED AT THE END OF ONE COMPLETE PASS OF
THE DISK SYSTEM.

6.9 MEMORY PARITY ERROR

THIS MESSAGE IS REPORTED IF THE PROGRAM DETECTS A PARITY
ERROR DURING PROGRAM EXECUTION.

6.10 POWER HAS FAILED

THIS MESSAGE INDICATES THAT THE POWER HAS FAILED AND THE
TEST RESTORED.

7. MISCELLANEOUS

IN SOME ADDRESS TESTS THE PROGRAM DEPENDS ON WRITTING AND READING DATA CORRECTLY FROM THE DISK, AND IF IT DOES NOT IT MAY REPORT AN ADDRESS FAILURE, WHEN IN FACT IT WAS A DATA FAILURE.

7.1 SUGGESTED POWER FAIL TEST

THIS TEST IS SUGGESTED SO THAT THE ABILITY OF THE DISK TO RETAIN DATA AFTER A POWER FAILURE HAS OCCURRED MAY BE TESTED.

FOLLOW THESE STEPS IF NO ERROR OCCURS, ONE PASS SHOULD BE SUFFICIENT:

- A) LOAD AND START PFT1
- B) UPON RECEIVING "OK" FROM THE PROGRAM TURN OFF THE POWER TO THE MACHINE AND THEN BACK ON AGAIN.
- C) THERE SHOULD BE AT MOST ONE ERROR. ANY MORE IS CONSIDERED UNRELIABLE.
- D) PERFORM THE SAME STEPS WITH PFT2. THIS TIME THERE SHOULD BE NO ERRORS.

```

1
2
3
4
5
6
7
8
9
10      000001
11      000002
12      000004
13      000010
14      000020
15      000040
16      000100
17      000200
18      000400
19      001000
20      002000
21      004000
22      010000
23      020000
24      040000
25      100000
26
27
28
29      104403
30      104407
31      104405
32
33      000000
34      000020
35      000020 011052
36      000022 000000
37      000024 011376
38      000026 000340
39      000030 000030
40      000030 012464
41      000032 000340
42      000034 006344
43      000036 000340
44
45      000200
46      000200 000167 000712
47      000204 006436
48      000206 000200
49
50
51      000300

```

.TITLE MAINDEC-11-DZRFB-B RF11 DATA TEST REPLACES D50A

;COPYRIGHT 1973, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
;PROGRAM BY E. HAIGHT/C, CASWELL
;ENABL ABS

BIT0=1
BIT1=2
BIT2=4
BIT3=10
BIT4=20
BIT5=40
BIT6=100
BIT7=200
BIT8=400
BIT9=1000
BIT10=2000
BIT11=4000
BIT12=10000
BIT13=20000
BIT14=40000
BIT15=100000

;
;
;
WRITE=TRAP+3
WRCHECK=TRAP+7
READ=TRAP+5

;TRAP CATCHER 0 = 776

;BACKGROUND TEST VECTOR

;POWER FAIL

;TTY VECTOR

;DISK CALLING VECTOR

;DISK INTERRUPT VECTOR

;DISK PRIORITY

;
;=200
JMP START
DKINT
200

;STATIC ROUTINES
;=300

52						
53						
54		000600		.=600		
55	000600	000167	001344	JMP	ADT2	;CHECK THAT WHEN A
56						;WORD IS WRITTEN IT
57						;DOES NOT ALTER ADJACENT
58						;WORDS
59						;
60						;
61	000604	000167	002204	JMP	ADT3	;WRITE EACH WORD ADDR ON ITSELF AND
62						;READ BACK TO COMPARE
63						;
64						;
65	000610	000167	002554	JMP	ADT4	;TRACK SELECTION TEST
66						;
67						;
68	000614	000167	003176	JMP	ADT5	;LOOK AHEAD TEST
69						;
70						;
71	000620	000167	003406	JMP	SPIRAL	;SPIRAL TEST
72						;
73						;
74	000624	000167	003752	JMP	XSPIRAL	;SPIRAL TEST EXTENSION
75						;
76						;
77	000630	000167	004730	JMP	RANEX	;RANDOM ADDRESS, DATA AND
78						;WORD COUNT TEST
79						;
80						;
81	000634	000167	007774	JMP	EXTMEN	;WRITE/WRITE CHECK DISK WITH
82						;EXTENDED MEMORY
83						;
84						;
85	000640	000167	010340	JMP	PFT1	;DISK WRITE POWER FAIL TEST
86						;
87						;
88	000644	000167	010572	JMP	PFT2	;DISK WRITE CHECK POWER FAIL TEST
89						;
90						;
91						;***MAINTENANCE ROUTINES***
92						;
93						;
94	000650	000167	011130	JMP	SELWC	;LOAD WORD COUNT REG,
95						;WITH SWITCH REGISTER
96						;
97						;
98	000654	000167	011134	JMP	SELCHA	;LOAD CURRENT MEMORY ADDR
99						;REG. WITH SWITCH REGISTER
100						;
101						;
102	000660	000167	011140	JMP	SELDAR	;LOAD DISK ADDR. REGISTER
103						;WITH SWITCH REGISTER
104						;
105						;

```

106 000664 000167 011144      JMP      SELDAE      ;LOAD DISK ADDR. EXT.
107                                ;WITH SWITCH REGISTER
108                                ;
109                                ;
110 000670 000167 011150      JMP      SELDBR      ;LOAD DATA BUFFER REGISTER
111                                ;WITH SWITCH REGISTER
112                                ;
113                                ;
114 000674 000167 011154      JMP      MOVLR      ;MOVE CONTENTS OF LOOK
115                                ;AHEAD REGISTER INTO DATA LIGHTS
116                                ;
117                                ;
118 000700 000167 011162      JMP      SELDCS      ;LOAD DISK CONTROL REGISTER
119                                ;WITH SWITCH REGISTER
120                                ;
121                                ;
122 000704 000167 011226      JMP      STAMP      ;ENABLE READ AMPLIFIERS
123                                ;TO TRACK SELECTED
124                                ;FROM SWITCH REGISTER
125                                ;
126                                ;
127                                ;
128                                ;
129                                ;
130                                ;
131                                ;
132                                ;
133      ;RF11 DATA TEST
134      ;VECTORS USED IN PROGRAM
135      ;01 LOC 204 DISK INTERRUPT
136      ;02 LOC 30 EMT (TELETYPE OUTPUT)
137      ;03 LOC 34 TRAP (DISK HANDLERS)
138      ;04 LOC 14 TRACE TRAP (USED IN BACKGROUND TEST)
139      ;05 LOC 20 IOT TRAP (USED IN CALLING BACKGROUND TEST)
140
141      001000      .=1000

```

142				
143			.EVEN	
144			I	
145			I I/O ADDRESS POINTERS	
146	001000	177570	SWR:	177570
147	001002	177776	PS:	177776
148	001004	177566	TPB:	177566
149	001006	177562	TKB:	177562
150	001010	177564	TPS:	177564
151	001012	177560	TKS:	177560
152			I	
153			I DISK I/O REGISTERS	
154			I	
155	001014	177460	DCS:	177460
156	001016	177462	WC:	177462
157	001020	177464	CMA:	177464
158	001022	177466	DAR:	177466
159	001024	177470	DAE:	177470
160	001026	177472	DBR:	177472
161	001030	177474	MA:	177474
162	001032	177476	ADS:	177476
163	001034	000204	VECTOR:	204
164	001036	000206	STATUS:	206
165	001040	000200	PRIORITY:	BIT7
166				
167			I	
168			I	
169			I	
170			I	
171			I	
172			I	
173			I RF11 DEDICATE REGISTERS (MEMORY)	
174			I	
175	001042	000000	FLAG:	0
176	001044	146723	RANNU:	146723
177	001046	000000	WRDCT:	0
178	001050	000000	TRACK:	0
179	001052	000000	DNA:	0
180	001054	000000	PATNU:	0
181	001056	000000	BUF:	0
182	001060	000000	TWRDCT:	0
183	001062	000000	TDNA:	0
184	001064	000000	SWRDCT:	0
185	001066	000000	ERCOUNT:	0
186	001070	000000	SAVE:	0
187	001072	000000	SAV1:	0
188	001074	000000	PASS:	0
189	001076	000000	DEKNOR:	0
190	001100	000000	HRDER:	0
191	001102	000000	PASSC:	0
192	001104	000000	INPUT:	0
193				
194			I	
195			I RF11 WORK REGISTERS	

ISWITCH REGISTER
IPROCESSOR STATUS REGISTER
ITELETYPE REGISTERS

IDISK CONTROL REGISTER
IWORD COUNT REGISTER
ICURRENT ADDRESS REGISTER
ILOWER 16 BITS OF DISK ADDRESS
IEXTENSION ADDRESS REGISTER
IDATA BUFFER REGISTER
IMAINTENANCE REGISTER
ILOOK AHEAD REGISTER
IINTERRUPT VECTOR ADDRESS
IDISK INTERRUPT STATUS
IDISK PRIORITY LEVEL

IINTERNAL PROGRAM FLAG
IRANDOM NUMBER PRIME
IWORKING WORD COUNT
IWORKING DAE
IWORKING DAR
IDATA PATTERN INDEX
IWORKING DATA BUFFER (OUT-IN)
ITEMP WORD COUNT
ITEMP DAR
ISTANDARD WORD COUNT
IERROR COUNT FOR MESSAGES.

IPOINTER FOR HARD ERROR

196
197 001106 000000
198 001110 000000
199 001112 000000
200 001114 000000

;(CAN BE CHANGED IN ANY ROUTINE)
WORK: 0
WORK1: 0
WORK2: 0
WORK3: 0

201					START:	RESET		
202	001116	000005			MOV	#10,WORK		;CLEAR THE WORLD
203	001120	012767	000010	177760	CLRTAB:	MOV	#TABLE,#0	;CLEAR ERROR TABLE
204	001126	012700	013426		CLR	(0)+		
205	001132	005020			DEC	WORK		
206	001134	005367	177746		BNE	CLRTAB		
207	001140	001372			MOV	#1000,#6		;SET UP STACK
208	001142	012706	001000		MOV	#340,#PS		;LOCK UP INTERRUPT LEVELS
209	001146	012777	000340	177626	CLR	FLAG		;CLEAR PROGRAM FLAG
210	001154	005067	177662		CLR	TRACK		;CLEAR TRACK REGISTERS
211	001160	005067	177664		CLR	DNA		;CLEAR DAN REGISTERS
212	001164	005067	177662		CLR	PATNU		;CLEAR PATTERN COUNT
213	001170	005067	177660		MOV	#400,SWRDCT		;SET UP STANDARD WORD COUNT
214	001174	012767	000400	177662	MOV	SWRDCT,WRDCT		
215	001202	016767	177656	177636	JSR	7,MANF		;SET PARITY SWITCHES
216	001210	004767	012012		TST	PSWR		
217	001214	005777	177560		BNI	CONH		;OPERATE UNDER PROGRAM CONTROL
218	001220	100464			BIS	#70000,FLAG		
219	001222	052767	070000	177612	CLR	TEXBUF		
220	001230	005067	012212		SPECOR:	BIT	#BIT11,ODCS	;TEST NON-EXISTENT DISK
221	001234	032777	004000	177552	BNE	RCNODV		;NO DEVICE!
222	001242	001013			CMP	#10,TEXBUF		;TESTED FOR ALL DEVICES?
223	001244	022767	000010	012174	BEQ	RCNODV		;REPORT NUMBER
224	001252	001407			ADD	#1,TEXBUF		;INC. DEVICE COUNT
225	001254	062767	000001	012164	ADD	#4,ODAE		;ADDRESS NEXT DISK
226	001262	062777	000004	177534	RR	SPECOR		
227	001270	000761			TST	TEXBUF		;TEST FOR 0 DEVICES
228	001272	005767	012150		BNE	REPDRV		
229	001276	001003			ENT+1			;REPORT 0 DEVICES
230	001300	104001			MODRV			
231	001302	014417			HALT			
232	001304	000000			REPDRV:	JSR	#5,CONV	;CONVERT TO ASCII
233	001306	004567	011422		TEXBUF			
234	001312	013446			RKNUM			
235	001314	014444			1			
236	001316	000001			ENT+0			;TYPE NUMBER OF DEVICES
237	001320	104000			NEDSA			
238	001322	013534			RKNUM			
239	001324	014444			-1			
240	001326	177777			MOV	TEXBUF,DSKNOR		;SAVE 0 OF DISKS
241	001330	016767	012112	177540	SUB	#1,DSKNOR		;FIRST DISK IS ZERO
242	001336	162767	000001	177532	ROL	DSKNOR		;SHIFT LEFT TO MATCH
243	001344	006167	177526		ROL	DSKNOR		;FLAG POSITION
244	001350	006167	177522		BIS	#BIT11,FLAG		;SET PROGRAM MODE IN FLAG
245	001354	052767	004000	177460	CLR	ODAE		;RESET TO DISK 0
246	001362	005077	177436		JMP	ADTST		
247	001366	000167	000464		;ENTER OPERATOR CONVERSATION MODE			
248					CONH:	ENT	+1	;ASK ABOUT DATA TEST ONLY
249	001372	104001			CON1			
250	001374	014062			JSR	#7,ALPHA		;GO WAIT FOR ANSWER
251	001376	004767	011424		CMP	#153,TEXBUF		;TEST FOR YES
252	001402	022767	000153	012036	BNE	,+10		;BRANCH IF NO
253	001410	001003			BIS	#BIT10,FLAG		
254	001412	052767	002000	177422				

255	001420	104001			ENT	+1	
256	001422	014104			CON2		;ASK ABOUT MULTI DISK MODE
257	001424	004767	011376		JSR	87,ALPHA	;GO WAIT FOR ANSWER
258	001430	022767	000153	012010	CMP	8153,TEXBUF	;TEST FOR YES
259	001436	001026			BNE	DATTES	;DO NOT ENTER STATIC TEST
260	001440	052767	004000	177374	BIS	8BIT11,FLAG	;SET FLAG TO ENTER STATIC TEST
261	001446	104001			ENT	+1	
262	001450	014124			CON3		
263	001452	004767	011340		JSR	87,NOCHA	
264	001456	162767	000001	011762	SUB	81,TEXBUF	
265	001464	022767	000010	011754	CMP	810,TEXBUF	
266	001472	101765			BLOS	DSKDR	
267	001474	016767	011746	177374	MOV	TEXBUF,DSKNOR	
268	001502	006167	177370		ROL	DSKNOR	
269	001506	006167	177364		ROL	DSKNOR	
270	001512	000420			BR	ASKWC	
271	001514	104001			ENT	+1	
272	001516	014155			CON4		;ASK UNIT NUMBER
273	001520	004767	011272		JSR	87,NOCHA	;WAIT FOR NO.
274	001524	022767	000010	011714	CMP	810,TEXBUF	;IS NO = 0>10
275	001532	101770			BLOS	DATTES	;NO
276	001534	000241			CLC		
277	001536	006167	011704		ROL	TEXBUF	
278	001542	006167	011700		ROL	TEXBUF	
279	001546	056767	011674	177266	BIS	TEXBUF,FLAG	
280	001554	104001			ENT	+1	
281	001556	014166			CON5		;ASK ABOUT OPTIONAL WORD COUNT
282	001560	004767	011242		JSR	87,ALPHA	;WAIT FOR ANSWER
283	001564	022767	000153	011654	CMP	8153,TEXBUF	
284	001572	001021			BNE	OPDAR	;ASK ABOUT OPTIONAL DAR
285	001574	104001			ENT	+1	
286	001576	014205			CON6		;ASK LENGTH OF WC
287	001600	004767	011212		JSR	87,NOCHA	
288	001604	005767	011636		TST	TEXBUF	
289	001610	001771			BEO	WCCON	
290	001612	022767	001001	011626	CMP	81001,TEXBUF	;IS WORD COUNT>1000
291	001620	101765			BLOS	WCCON	;YES ASK FOR COUNT AGAIN
292	001622	016767	011620	177234	MOV	TEXBUF,SWRDCT	;OPERATING WORD COUNT
293	001630	016767	177230	177210	MOV	SWRDCT,WRDCT	
294	001636	104001			ENT	+1	
295	001640	014232			CON7		;ASK ABOUT OPTIONAL DAR
296	001642	004767	011150		JSR	87,NOCHA	
297	001646	022767	004000	011572	CMP	84000,TEXBUF	;3777 MAX DAR ADDR
298	001654	101770			BLOS	OPDAR	
299	001656	016767	011564	177166	MOV	TEXBUF,DNA	;TEMP DAR REGISTER

300									
301	001664	104001			OPPAT:	ENT	+1		
302	001666	014245				CON8			;ASK ABOUT DATA PATTERNS
303	001670	004767	011122			JSR	87,NOCHA		
304	001674	022767	000023	011544		CMP	823,TEXBUF		;TEST FOR CORRECT NO
305	001702	101770				BLOS	OPPAT		;ASK AGAIN
306	001704	022767	000022	011534		CMP	822,TEXBUF		
307	001712	001414				BEO	OPWRT		;DATA PATTERN UNDER PROGRAM CONTROL
308	001714	052767	100000	177120		BIS	8BIT15,FLAG		;SET PROGRAM FLAG
309	001722	016767	011520	177124		MOV	TEXBUF, PATNU		;OPERATOR WANTS TO SELECT DATA
310	001730	000241				CLC			
311	001732	006167	177116			ROL	PATNU		
312	001736	042767	070000	177076		BIC	870000,FLAG		;CLEAR OP MODE BITS IN FLAG
313	001744	104001			OPWRT:	ENT	+1		
314	001746	014270				CON9			;ASK ABOUT WRITE
315	001750	004767	011052			JSR	87,ALPHA		
316	001754	022767	000153	011464		CMP	8153,TEXBUF		;TEST FOR YES
317	001762	001003				BNE	OPWCK		;ASK ABOUT WRITE CHECK
318	001764	052767	040000	177050		BIS	8BIT14,FLAG		;YES SET FLAG BIT
319	001772	104001			OPWCK:	ENT	+1		
320	001774	014300				CON10			;ASK ABOUT WRITE CHECK
321	001776	004767	011024			JSR	87,ALPHA		
322	002002	022767	000153	011436		CMP	8153,TEXBUF		;TEST FOR YES ANSWER
323	002010	001003				BNE	OPRD		;GO ASK ABOUT READ
324	002012	052767	020000	177022		BIS	8BIT13,FLAG		;YES SET FLAG BIT
325	002020	104001			OPRD:	ENT	+1		
326	002022	014316				CON11			;ASK ABOUT READ
327	002024	004767	010776			JSR	87,ALPHA		
328	002030	022767	000153	011410		CMP	8153,TEXBUF		;TEST FOR YES ANSWER
329	002036	001003				BNE	CHKFLG		
330	002040	052767	010000	176774		BIS	8BIT12,FLAG		;SET FLAG TO READ
331	002046	032767	070000	176766	CHKFLG:	BIT	870000,FLAG		
332	002054	001733				BEO	OPWRT		
333									
334									
335									
336	002056	032767	004000	176756	ADTST:	BIT	8BIT11,FLAG		;ARE WE IN MULTI DISK MODE
337	002064	001423				BEO	EXMFLG		;BRANCH IF NO,
338	002066	104001				ENT	+1		
339	002070	014002				ME811			
340	002072	016767	176744	010714		MOV	FLAG,ACHVX		
341	002100	006067	010710			ROR	ACHVX		
342	002104	006067	010704			ROR	ACHVX		
343	002110	042767	177770	010676		BIC	8177770,ACHVX		;FETCH DISK 8
344	002116	004567	010612			JSR	85,CONV		
345	002122	013014				ACHVX			
346	002124	014014				ME812			
347	002126	000001				1			
348	002130	104001				ENT	+1		
349	002132	014014				ME812			
350	002134	032767	002000	176700	EXMFLG:	BIT	8BIT10,FLAG		;TEST FOR DATA TEST ONLY
351	002142	001402				BEO	,+6		;DO COMPLETE TEST
352	002144	000167	003020			JMP	DATAT		;DO DATA TEST ONLY
353									

```

354
355
356
357      ;***ADDRESS ADT2***
358      ;
359      ;IN THIS TEST WRITE TRACK ZERO WITH ZERO'S
360      ;THEN WRITE ALL ONES IN AN ADDRESS
361      ;CHECK IF WRITING ONES IN THAT ADDRESS ALTERED
362      ;ANY OTHER ADDRESS IN THE TRACK
363      ;FOLLOW THIS PROCEDURE FOR ADDRESSES 0 TO 3777
364      ;
365      ;
366      002150 012706 001000      ADT2:  MOV      $1000,$6      ;SET UP STACK
367      002154 012767 001000 176664      MOV      $1000,WRDCT      ;SET UP WORD COUNT
368      002162 012767 014466 176666      MOV      @OUTBUF,BUF      ;SET UP CURRENT ADDRESS
369      002170 016767 176660 176672      MOV      PATNU,SAVE
370      002176 005067 176652      CLR      PATNU
371      002202 005067 176642      CLR      TRACK
372      002206 005067 176640      CLR      DMA
373      002212 004567 005402      JSR      $5,PASEL      ;SET UP DATA BUFFER
374      002216 016767 176646 176630      MOV      SAVE,PATNU
375      ;****WRITE DISK ADDR. 0 TO 3777 WITH ZEROES ****
376      002224 052777 000400 176562      RFADT:  BIS      @BITS,@DCS
377      002232 104403      WRITE
378      002234 105777 176554      TSTB     @DCS      ;TEST FOR READY
379      002240 100375      BPL      @-4
380      002242 005777 176546      TST      @DCS      ;TEST FOR ERROR
381      002246 100016      BPL      @DMORE
382      002250 012767 000001 176610      MOV      $1,ERCOUNT      ;ERROR OCCURRED
383      002256 017767 176532 176624      MOV      @DCS,WORK1      ;FETCH DCS REGISTER
384      002264 017767 176532 176614      MOV      @DAR,WORK
385      002272 005367 176610      DEC      WORK
386      002276 004567 010070      ER1:   JSR      $5,STAER1      ;REPORT ERROR OCCURRED
387      ;****NRD1=CONTROL STATUS REG. AT THE TIME OF THE ERROR ****
388      ;****NRD2=DISK ADDR. AT THE TIME OF THE ERROR ****
389      002302 000750      BR      RFADT      ;LOOP ON ERROR
390      002304 022767 003000 176540      @DMORE:  CMP      $3000,DMA
391      002312 001404      BEQ      RFRD-4
392      002314 062767 001000 176530      ADD      $1000,DMA
393      002322 000740      BR      RFADT
394      002324 005067 176542      CLR      SAV1
395      002330 005067 176534      RFRD:  CLR      SAVE

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396
397
398 002334 012727 177777 177777 NONWD1 MOV 0-1,0-1
399 002342 012767 002340 176506 MOV 0NONWD+4,BUF
400 002350 012767 000001 176470 MOV 01,WRDCT
401 002356 016767 176510 176466 MOV SAV1,DMA
402 002364 052777 000400 176422 BIS 0BIT0,0DCS
403 002372 104403 WRITE
404 002374 105777 176414 TSTB 0DCS ;TEST FOR READY
405 002400 100375 BPL -4
406 002402 005777 176406 TST 0DCS ;TEST FOR ERROR
407 002406 100014 BPL SUADB ;BRANCH IF NO CONTROL ERROR
408 002410 017767 176400 176472 MOV 0DCS,WORK1
409 002416 016767 176450 176462 MOV SAV1,WORK
410 002424 012767 000003 176434 MOV 03,ERCOUNT ;SETUP ERROR COUNT
411 002432 004567 007734 ER3: JSR 05,STAER1 ;REPORT ERROR
412 ;****WRD1=DISK CONTROL STATUS AT THE TIME OF THE ERROR****
413 ;****WRD2=DISK ADDR, IN ERROR WHEN TRYING TO WRITE ALL ONES ****
414 002436 000736 BR NONWD ;RE-WRITE WORD
415 002440 016767 176426 176440 SUADB: MOV SAV1,WORK
416 002446 042767 000777 176432 BIS 0777,WORK ;MASK TO BLOCKS
417 002454 016700 176412 MOV SAV1,00
418 002460 006100 ROL 00
419 002462 042700 176001 176412 BIS 0176001,00 ;MASK TO BUFFER SIZE
420 002466 026767 176376 176412 CMP SAVE,WORK
421 002474 001407 BEQ 18 ;TEST WORD IN THIS BLOCK
422 002476 005060 014466 - CLR OUTBUF(0) ;NOT IN BLOCK-CLEAR
423 002502 022767 004000 176360 CMP 04000,SAVE ;WRITTEN ALL TRACKS?
424 002510 001463 BEQ ZEROAD
425 002512 000403 BR WRCADT
426 002514 012760 177777 014466 18: MOV 0-1,OUTBUF(0) ;SET BUFFER WD TO-1
427 002522 052777 000400 176264 WRCADT: BIS 0BIT0,0DCS
428 002530 012767 001000 176310 MOV 01000,WRDCT ;SETUP WORD COUNT
429 002536 012767 014466 176312 MOV 0OUTBUF,BUF ;SETUP CURRENT ADDR
430 002544 016767 176320 176300 MOV SAVE,DMA ;SETUP DISK ADDRESS
431 002552 104407 WRCHECK
432 002554 105777 176234 TSTB 0DCS ;CHECK FOR READY
433 002560 100375 BPL -4
434 002562 005777 176226 TST 0DCS ;TEST FOR ERROR
435 002566 100030 BPL CHKBUF ;BRANCH NO DISK ERROR
436 002570 017767 176220 176312 MOV 0DCS,WORK1
437 002576 016767 176270 176302 MOV SAV1,WORK
438 002604 005367 176276 DEC WORK
439 002610 012767 000004 176250 MOV 04,ERCOUNT ;SET UP ERCOUNT
440 002616 004567 007550 ER4: JSR 05,STAER1 ;REPORT ERROR
441 002622 017767 176174 010164 MOV 0DAR,ACHVX ;SET UP DISK ADDR, FOR REPORT
442 002630 004567 010100 JSR 05,CONV
443 002634 013014 ACHVX
444 002636 013663 HES4
445 002640 000006 E
446 002642 104001 ENT +1
447 002644 013663 HES4
448 ;****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****
449 ;****WRD2=DISK ADDR, IN ERROR DURING WRITE CHECK ****

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MAINDEC-11-DZRFB-B
DZRFBB,P11

RF11 DATA TEST REPLACES D50A

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450
451 002646 000725

*****WRD ADDR.=ADDR. WHICH CONTAINS ALL ONES ****
BR WRCADT

```

452
453
454 002650 062767 001000 176212 CHKBUFF: ADD      01000,SAVE      ;GO TO NEXT
455 002656 000670          BR        SUADR        ;BLOCK
456 002660 005067 176204          ZEROAD: CLR      SAVE        I
457 002664 016767 176202 176160          MOV      SAV1,DMA      ;SETUP DISK ADDRESS
458 002672 005027 000000          CLR      00          ;SET UP DATA
459 002676 012767 002674 176152          MOV      0,-2,BUF      ;SETUP CURRENT ADDRESS
460 002704 012767 000001 176134          MOV      01,WRDCT      ;SETUP WORD COUNT
461 002712 104403          WRITE
462 002714 105777 176074          TSTB      0DCS        ;CHECK FOR READY
463 002720 100375          BPL      -4
464 002722 005777 176066          TST      0DCS        ;TEST FOR ERROR
465 002726 100014          BPL      INDADT
466 002730 012767 000005 176130          MOV      05,ERCOUNT
467 002736 017767 176052 176144          MOV      0DCS,WORK1
468 002744 017767 176052 176134          MOV      0DAR,WORK
469 002752 004567 007414          ERS:   JSR      05,STAER1
470          ;****WRD1=CONTROL STATUS REG, AT THE TIME OF THE ERROR ****
471          ;****WRD2=DISK ADDR, AT THE TIME OF THE ERROR ****
472 002756 000740          BR        ZEROAD      ;LOOP ON ERROR
473 002760 022767 003777 176104          INDADT: CMP      03777,SAV1
474 002766 001404          BEQ      LP2ADT      ;LAST ADDR, CHECKED
475 002770 005267 176076          INC      SAV1
476 002774 000167 177330          JMP      HFPD
477 003000 032777 004000 175772          LP2ADT: BIT      0BIT11,0SWR      ;CHECK NEXT ADDRESS
478 003006 001402          BEQ      -6          ;IS BIT 11 SET IN SWR
479 003010 000167 177134          JMP      ADT2        ;BIT 11 SET LOOP ON TEST
480          ;
481          ;
482          ;
483
484

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MAINDEC-11-DZRFB-B
DZRFBB.P11

RF11 DATA TEST REPLACES D50A

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485


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486
487
488
489
490
491
492
493
494
495 003014 005067 176032
496 003020 005067 176024
497 003024 005067 176056
498 003030 005067 176054
499 003034 012706 001000
500 003040 012767 014466 176010
501 003046 012767 001000 175772
502 003054 012700 014466
503 003060 016720 176022
504 003064 005267 176016
505 003070 022700 016466
506 003074 001371
507 003076 016767 176004 175764
508 003104 052777 000400 175702
509 003112 104403
510 003114 105777 175674
511 003120 100375
512 003122 005777 175666
513 003126 100011
514 003130 017767 175660 175750
515 003136 012767 000006 175722
516 003144 004567 007154
517
518 003150 000755
519 003152 016767 175712 175726
520 003160 062767 001000 175664
521 003166 022767 004000 175712
522 003174 001327
523 003176 005067 175704
524 003202 005067 175644
525 003206 005067 175676
526 003212 052777 000400 175574
527 003220 104405
528 003222 105777 175566
529 003226 100375
530 003230 005777 175560
531 003234 100011
532 003236 012767 000007 175622
533 003244 017767 175544 175634
534 003252 004567 007046
535
536 003256 000755
537 003260 012767 014466 175602

;***** ADDRESS TEST *****
;
;WRITE EACH UNIQUE ADDRESS ON ITSELF FOR TRACK 0
;THEN READ IT BACK AND COMPARE FOR THE
;CORRECT DATA
;
;
ADT3: CLR DMA ;CLEAR ACTIVE REG
      CLR TRACK
      CLR WORK
      CLR WORK1
      MOV $1000,$6 ;SETUP STACK
      MOV $OUTBUF,BUF ;SET UP CURRENT ADDRESS
      MOV $1000,WRDCT ;SET UP WORD COUNT
      MOV $OUTBUF,$0 ;FILL BUFFER WITH COUNT
INADB: MOV WORK,(0)+
      INC WORK ;+1 COUNT
      CMP $OUTBUF+2000,$0
      BNE INADB ;SET UP NEXT WORD
WRABF: BIS $BIT0,$DCS ;CLEAR THE DISK WORLD
      WRITE ;WRITE
      TSTB $DCS ;IS THE CONTROL READY
      BPL $-4 ;CONTROL READY
      TST $DCS ;IS THERE AN ERROR
      BPL TFBL ;NO ERROR
      MOV $DCS,WORK ;FETCH CONTENTS OF CONTROL REG
      MOV $6,ERCOUNT ;SET UP ERROR COUNT
      JSR $5,STAER ;REPORT CONTROL ERROR
;****WRD1=DISK CONTROL STATUS REG, AT THE TIME OF THE ERROR ****
      BR WRABF ;RE-WRITE DATA
TFBL: MOV SAVE,WORK
      ADD $1000,DMA
      CMP $4000,WORK ;HAVE WE WRITTEN ALL OF TRACK 0
      BNE INADB-4
      CLR WORK
      CLR DMA
      CLR WORK1
      BIS $BIT0,$DCS ;CLEAR THE DISK
      READ
      TSTB $DCS ;IS THE CONTROL READY
      BPL $-4 ;YES THE CONTROL IS READY
      TST $DCS ;IS THERE AN ERROR
      BPL ADRCMP ;NO ERROR
      MOV $7,ERCOUNT ;SET UP ERROR COUNT
      MOV $DCS,WORK ;FETCH CONTROL REG.
      JSR $5,STAER ;REPORT CONTROL ERROR
;****WRD1=DISK CONTROL STATUS REG, AT THE TIME OF THE ERROR ****
      BR RDTDN ;RE-READ
      ADRCMP: MOV $OUTBUF,SAVE

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538
539 003266 027767 175576 175614 CHPNEX: CMP      @SAVE,WORK1      ;IS THE ADDRESS CORRECT
540 003274 001410                BEQ      INCCMP      ;COMPARE NEXT WORD
541 003276 017767 175566 175602                MOV      @SAVE,WORK      ;FETCH LOAD ADDRESS
542 003304 012767 000010 175554                MOV      @10,ERCOUNT      ;SET UP ERROR COUNT
543 003312 004567 007054                ER10: JSR      @5,STAER1      ;REPORT COMPARISON ERROR
544                ;****WRD1=DISK ADDR, WANTED ****
545                ;****WRD2=DISK ADDR, RECEIVED ****
546 003316 062767 000002 175544 INCCMP: ADD      @2,SAVE
547 003324 005267 175560                INC      WORK1
548 003330 022767 016466 175532                CMP      @OUTBUF+2000,SAVE ;IS IT THE LAST ADDR INBUF
549 003336 001353                BNE      CHPNEX      ;COMPARE NEXT WORD
550 003340 022767 004000 175542                CMP      @4000,WORK1      ;IS IT THE LAST ADDR, OF TRACK
551 003346 001404                BEQ      LPADT3
552 003350 062767 001000 175474                ADD      @1000,DMA      ;SET UP FOR NEXT BUFFER
553 003356 000715                BR      RDTDN      ;GO READ BUFFER
554 003360 032777 004000 175412 LPADT3: BIT      @BIT11,@SWR      ;LOOP ON TEST?
555 003366 001212                BNE      ADT3      ;YES BIT 11 SET IN SWR
556
557
558
559
560
561                ;RF11 TRACK SELECTION TEST
562
563                ;WRITE THE FIRST AND LAST ADDRESS OF EACH TRACK
564                ;WITH THE OCTAL VALUE OF EACH TRACK
565                ;BITS 0 THRU 6 EQUAL THE TRACK NUMBER
566                ;BIT 15 RESET EQUALS ADDR 0 OF THE TRACK
567                ;BIT 15 SET EQUALS ADDR 3777 OF THE TRACK
568
569                ;AFTER WRITING THE DISK READ EACH ADDRESS
570                ;AND COMPARE DATA FOR THE CORRECT VALUE
571
572 003370 005067 175456                ADT4: CLR      DMA      ;CLEAR WORK REGISTERS
573 003374 005067 175450                CLR      TRACK
574 003400 005067 011062                CLR      OUTBUF
575 003404 012706 001000                MOV      @1000,@6      ;SETUP STACK
576 003410 052777 000400 175376                BIS      @BIT8,@DCS      ;CLEAR THE DISK WORLD
577 003416 012767 014466 175432                MOV      @OUTBUF,BUF      ;SET CURRENT ADDRESS
578 003424 012767 000001 175414                MOV      @1,WRDCT      ;SET UP WORD COUNT
579 003432 104403                INSWT: WRITE      ;GO WRITE
580 003434 105777 175354                TSTB      @DCS      ;IS READY SET
581 003440 100375                BPL      ,=4      ;YES! WAIT FOR NOT BUSY
582 003442 005777 175346                TST      @DCS      ;TEST FOR ERROR
583 003446 100011                BPL      TSTTK      ;NO ERROR GO ON
584 003450 012767 000011 175410                MOV      @11,ERCOUNT      ;SET UP ERROR COUNT
585 003456 017767 175332 175422                MOV      @DCS,WORK      ;REPORT CONTENTS OF DCS REG
586 003464 004567 006634                ER11: JSR      @5,STAER      ;REPORT ERROR OCCURRED
587                ;****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****
588 003470 000760                BR      INSWT      ;GO RE-WRITE
589 003472 022767 100177 010766 TSTTK: CMP      @100177,OUTBUF ;TEST FOR LAST ADDR.
590 003500 001427                BEQ      INSRD      ;GO READ THE DATA
591 003502 032767 100000 010756                BIT      @BIT15,OUTBUF ;IS IT ADDR ZERO

```

592	003510	001007			BNE	MVNEM	;NO
593	003512	052767	100000	010746	RIS	#BIT15,OUTBUF	;YES! SET UP FOR LAST ADDR
594	003520	062767	003777	175324	ADD	#3777,DMA	;SET UP FOR LAST ADDR
595	003526	000741			BR	INSWT	;GO WRITE
596	003530	042767	100000	010730	MVNEM; BIC	#BIT15,OUTBUF	;SET UP FOR ADDR ZERO
597	003536	005267	010724		INC	OUTBUF	;INC. TO NEXT TRACK
598	003542	062767	000001	175302	ADD	#1,DMA	;INC. BAR
599	003550	103330			BCC	INSWT	;GO WRITE NO CARRY TO DAE
600	003552	005267	175272		INC	TRACK	;INC. DAE REG.
601	003556	000725			BR	INSWT	;GO WRITE

```

602
603
604      ;
605      ;READ THE FIRST AND LAST ADDRESS OF EACH TRACK
606      ;AND VERIFY IT HAS THE CORRECT DATA
607 003560 005067 175266      INSRD: CLR      DMA      ;CLEAR WORK REG.
608 003564 005067 175260      CLR      TRACK
609 003570 005067 175274      CLR      SAVE
610 003574 052777 000400 175212  BIS      @BIT0,@DCS      ;CLEAR THE DISK WORLD
611 003602 012767 015070 175246  MOV      @INBUF,RUF      ;SET UP CURRENT ADDR
612 003610 012767 000001 175230  MOV      @1,WRDCT      ;SET UP WORD COUNT
613 003616 104405      RDTKS: READ      ;READ DATA
614 003620 105777 175170      TSTB     @DCS      ;CHECK FOR READY
615 003624 100375      BPL      ,-4      ;CONTROL NOT READY
616 003626 005777 175162      TST      @DCS      ;IS THERE AN ERROR
617 003632 100011      BPL      CMPDTK      ;NO ERROR
618 003634 012767 000012 175224  MOV      @12,ERCOUNT      ;SET UP ERROR COUNT
619 003642 017767 175146 175236  MOV      @DCS,WORK      ;FETCH CONTENTS OF DCS
620 003650 004567 006450      ER12: JSR      @5,STAER      ;REPORT CONTROL ERROR
621      ;****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****
622 003654 000760      BR      RDTKS      ;GO RE-READ
623 003656 026767 175206 011204  CMPDTK: CMP      SAVE,INBUF      ;IS DATA CORRECT
624 003664 001413      BEQ      CMNETK      ;YES SETUP FOR NEXT WORD
625 003666 016767 175176 175214  MOV      SAVE,WORK1      ;CORRECT ADDRESS
626 003674 016767 011170 175204  MOV      INBUF,WORK      ;INCORRECT DATA
627 003702 012767 000013 175156  MOV      @13,ERCOUNT      ;SET UP ERROR COUNT
628 003710 004567 006456      ER13: JSR      @5,STAER1      ;REPORT SELECTION ERROR
629      ;****WRD1=TRACK ADDR. WANTED ****
630      ;****WRD2=TRACK ADDR. RECEIVED ****
631 003714 022767 100177 175146  CMNETK: CMP      @100177,SAVE      ;IS IT THE LAST ADDR
632 003722 001427      BEQ      LPTSK      ;END OF TEST
633 003724 032767 100000 175136  BIT      @BIT15,SAVE      ;IS IT ADDR 0 OF THE TRACK
634 003732 001414      BEQ      ZRBIT      ;NO! SETUP FOR LAST ADDR
635 003734 042767 100000 175126  BIC      @BIT15,SAVE      ;SET UP FOR ADDR ZERO
636 003742 005267 175122      INC      SAVE      ;INC FOR TRACK NO.
637 003746 062767 000001 175076  ADD      @1,DMA      ;SET UP DAR
638 003754 103320      BCC      RDTKS      ;GO READ NEXT TRACK ADDR
639 003756 005267 175066      INC      TRACK      ;INC TRACK
640 003762 000715      BR      RDTKS      ;GO READ
641 003764 052767 100000 175076  ZRBIT: BIS      @BIT15,SAVE      ;SET UP FOR LAST ADDR
642 003772 062767 003777 175052  ADD      @3777,DMA      ;SET UP FOR LAST WORD
643 004000 000706      BR      RDTKS      ;GO READ LAST ADDR OF TK
644 004002 032777 004000 174770  LPTSK: BIT      @BIT11,@SWR      ;IS BIT 11 SET IN SWR
645 004010 001402      BEQ      ,+6      ;YES LOOP ON TEST
646 004012 000167 177352      JMP      ADT4

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647      ;
648      ;RF11 LOOK AHEAD TEST
649      ;WRITE ONE WORD UPON RECEIPT OF
650      ;NOT READY READ THE LOOK AHEAD
651      ;REGISTER IT SHOULD CONTAIN THE
652      ;ADDRESS +1
653      ;
654      004016 005067 175030      ADTS:  CLR      DMA          ;CLEAR REGISTERS
655      004022 005067 175022      CLR      TRACK
656      004026 005067 175036      CLR      SAVE
657      004032 012706 001000      MOV      #1000,%6      ;SETUP STACK
658      004036 012767 000001 175002      MOV      #1,WRDCT      ;SET UP FOR ONE WORD X-FER
659      004044 012767 014466 175004      MOV      @OUTBUF,BUF      ;SET UP CURRENT ADDRESS
660      004052 052777 000400 174734      WRADTS: BIS      @BIT0,@DCS      ;CLEAR THE DISK
661      004060 016700 174746      MOV      ADS,%0
662      004064 016701 174724      MOV      DCS,%1
663      004070 104403      WRITE
664      004072 011037 001106      18:  MOV      (0),@WORK      ;WRITE
665      004076 105711      TSTB      (1)      ;FETCH LOOK AHEAD
666      004100 100374      BPL      18      ;IS THE CONTROL BUSY
667      004102 005777 174706      TST      @DCS      ;CONTROL STILL BUSY
668      004106 100011      BPL      LPADTS      ;IS THERE AN ERROR
669      004110 012767 000014 174750      MOV      #14,ERCOUNT      ;NO DISK ERRORS
670      004116 017767 174672 174762      MOV      @DCS,WORK      ;SET UP ERROR COUNT
671      004124 004567 006174      ER14: JSR      %5,STAER      ;FETCH DCS FOR REPORT
672      ;*****WRD1=DISK CONTROL REG AT THE TIME OF THE ERROR ****
673      004130 000750      BR      WRADTS      ;REPROT CONTROL ERROR
674      004132 016767 174714 174750      LPADTS: MOV      DMA,WORK1      ;LOOP ON ERROR
675      004140 026767 174744 174740      CMP      WORK1,WORK      ;IS LOOK AHEAD CORRECT
676      004146 001416      BEQ      INCADS
677      004150 005367 174732      DEC      WORK      ;LOOK AHEAD OK
678      004154 026767 174730 174724      CMP      WORK1,WORK      ;COMPARE FOR ADDRESS+1
679      004162 001410      BEQ      INCADS
680      004164 005267 174716      INC      WORK      ;BRANCH IF EQUAL
681      004170 012767 000015 174670      MOV      #15,ERCOUNT
682      004176 004567 006170      ER15: JSR      %5,STAER1      ;REPORT LOOK AHEAD INCORRECT
683      ;*****WRD1=DISK ADDR. WANTED FROM LOOK AHEAD REG. ****
684      ;*****WRD2=DISK ADDR. RECEIVED FROM DISK LOOK AHEAD REG. ****
685      004202 000723      BR      WRADTS      ;LOOP ON ERROR
686      004204 022767 003777 174640      INCADS: CMP      #3777,DMA      ;IS IT THE LAST ADDR.
687      004212 001403      BEQ      XLPADTS      ;LAST ADDRESS EXIT
688      004214 005267 174632      INC      DMA      ;+1 DMA
689      004220 000714      BR      WRADTS      ;CHECK NEXT ADDRESS
690      004222 032777 004000 174550      XLPADTS: BIT      @BIT11,@SWP      ;LOOP ON TEST
691      004230 001272      BNE      ADTS      ;YES LOOP ON TEST BIT 11 SET

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ADDRESS	DATA	DATA	DATA	DATA	INSTRUCTIONS	INSTRUCTIONS
692					SPIRAL TESTS	
693					I	
694					IWRITE THE LAST WORD OF TRACK ZERO	
695					AND THE FIRST WORD OF TRACK ONE	
696					USING ONE WORD X-FERS	
697					DATE = 52525	
698	004232	052777	000400	174554	SPIRAL: BIS	8BITS,0DCS ;CLEAR THE DISK
699	004240	012777	000340	174534	MOV	8340,0PS ;LOCK UP PROCESSING
700	004246	012706	001000		MOV	81000,86 ;SETUP STACK
701	004252	012767	000001	174566	MOV	81,WRDCT ;SET WORD COUNT TO 1
702	004260	005067	174564		CLR	TRACK
703	004264	012767	003777	174560	MOV	83777,DMA ;LAST WORD OF TRACK ZERO
704	004272	012767	052525	010166	MOV	852525,OUTBUF ;SET UP DATA
705	004300	012767	014466	174550	MOV	8OUTBUF,BUF
706	004306	104403			WRITE	;WRITE LAST ADDR TK ZERO
707	004310	105777	174500		TSTB	0DCS ;TEST FOR READY
708	004314	100375			BPL	,=4 ;CONTROL STILL BUSY
709	004316	005777	174472		TST	0DCS
710	004322	100011			BPL	SPI11
711	004324	012767	000016	174534	MOV	816,ERCOUNT
712	004332	017767	174456	174546	MOV	0DCS,WORK
713	004340	004567	005760		ER16: JSR	85,STAER
714					;*****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****	
715	004344	000732			BR	SPIRAL
716	004346	005267	174500		SPI11: INC	DMA
717	004352	104403			WRITE	;WRITE FIRST ADDR. TK 1
718	004354	105777	174434		TSTB	0DCS ;WAIT FOR READY
719	004360	100375			BPL	,=4 ;CONTROL STILL BUSY
720	004362	005777	174426		TST	0DCS
721	004366	100011			BPL	SPI12
722	004370	012767	000017	174470	MOV	817,ERCOUNT
723	004376	017767	174412	174502	MOV	0DCS,WORK
724	004404	004567	005714		ER17: JSR	85,STAER
725					;*****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****	
726	004410	000710			BR	SPIRAL
727	004412	005267	174430		SPI12: INC	WRDCT ;SET UP FOR TWO WORD X-FER
728	004416	012767	003777	174426	MOV	83777,DMA ;START AT ADDR 3777
729	004424	012767	015070	174424	MOV	8INBUF,BUF
730	004432	104405			READ	;READ DATA
731	004434	105777	174354		TSTB	0DCS ;TEST FOR READY
732	004440	100375			BPL	,=4 ;CONTROL STILL BUSY
733	004442	005777	174346		TST	0DCS
734	004446	100011			BPL	SPI13
735	004450	012767	000020	174410	MOV	820,ERCOUNT
736	004456	017767	174332	174422	MOV	0DCS,WORK
737	004464	004567	005634		ER20: JSR	85,STAER
738					;*****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****	
739	004470	000660			BR	SPIRAL
740	004472	022767	052525	010370	SPI13: CMP	852525,INBUF ;CMP ADDR DAR 3777
741	004500	001414			BEO	CMPI1 ;COMPARE SECOND WORD
742	004502	012767	000021	174356	MOV	821,ERCOUNT ;SETUP ERROR COUNT
743	004510	016767	010354	174370	MOV	INBUF,WORK ;INCORRECT DATA
744	004516	012767	052525	174364	MOV	852525,WORK1 ;CORRECT DATA
745	004524	004567	005642		ER21: JSR	85,STAER1 ;

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746      ;*****WRD1=THE DATA THAT SHOULD HAVE BEEN IN ADDR. 3777****
747      ;*****WRD2=THE DATA READ FROM ADDR. 3777****
748      004530 000640      BR      SPIRAL      ;LOOP ON ERROR
749      004532 022767 052525 010332 CMPX1:  CMP      #52525,INBUF+2 ;COMPARE NEXT WORD
750      004540 001414      BEQ      LPSPI1      ;BRANCH IF DATA OK
751      004542 012767 000022 174316      MOV      #22,ERCOUNT      ;SETUP ERROR COUNT
752      004550 012767 052525 174332      MOV      #52525,WORK1      ;CORRECT DATA
753      004556 016767 010310 174322      MOV      INBUF+2,WORK      ;DATA READ FROM ADDR0 TK1
754      004564 004567 005602      ER22:  JSR      #5,STAER1      ;REPORT ERROR
755      ;*****WRD1=THE DATA THAT SHOULD BE IN ADDR. 0 OF TRACK 1 ****
756      ;*****WRD2=THE DATA READ FROM ADDR.0 OF TRACK 1 ****
757      004570 000620      BR      SPIRAL      ;LOOP ON ERROR
758      004572 032777 004000 174200 LPSPI1: BIT      #BIT11,0SWR      ;LOOP ON TEST?
759      004600 001214      BNE      SPIRAL      ;YES BIT 11 SET IN SWR

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[illegible]

014	005044	005267	174002		X3SPIL: INC	DMA	;SET UP TO READ ADDR 4000
015	005050	104403			HEAD		;READ DATA
016	005052	105777	173736		TSTB	BDC5	;TEST FOR READY
017	005056	100373			BPL	,=4	;CONTROL STILL BUSY
018	005060	005777	173730		TST	BDC5	;TEST FOR ERROR
019	005064	100011			BPL	X4SPIL	;BRANCH IF NO ERROR
020	005066	012767	000026	173772	MOV	026,ERCOUNT	;SET UP ERROR COUNT
021	005074	017767	173714	174004	MOV	BDC5,WORK	;REPORT CONTROL REG.
022	005102	004567	005216		ER26: JSR	05,STAER	;REPORT ERROR
023					;****WRD1=DISK CONTROL STATUS REG. AT THE TIME OF THE ERROR ****		
024	005106	000635			BR	XSPIRAL	;LOOP ON ERROR

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825
826 005110 022767 025252 007752 X4SPIL: CMP      025252,INBUF    ;CMP DATA
827 005116 001414                      BEQ      LPXSPIL      ;BRANCH IF DATA OK
828 005120 012767 000027 173740          MOV      027,ERCOUNT    ;SET UP ERROR COUNT
829 005126 012767 025252 173754          MOV      025252,WORK1    ;GOOD DATA
830 005134 016767 007730 173744          MOV      INBUF,WORK    ;DATA DATA
831 005142 004567 005224          ER27: JSR      05,STAER1    ;REPORT ERROR
832                      ;****WRD1=THE DATA THAT SHOULD BE IN ADDR, 0 OF TRACK 1 ****
833                      ;****WRD2=THE DATA THAT WAS READ FROM ADDR, 0 OF TRACK 1 ****
834 005146 000615                      BR      XSPIRAL        ;LOOP ON ERROR
835 005150 032777 004000 173622 LPXSPIL:BIT    0BIT11,0SWR    ;LOOP ON TEST?
836 005156 001211                      BNE      XSPIRAL        ;YES BIT11 SET IN SWR,
837 005160 005067 173666          CLRREG: CLR    DMA          ;CLEAR WORD ADDRESS
838 005164 005067 173660          CLR      TRACK          ;CLEAR TRACK ADDRESS
839
840
841
842
843
844
845
846
847
848 005170 012706 001000          DATAT: MOV      01000,06      ;SET UP STACK
849 005174 012777 000340 173600          MOV      0340,0PS      ;LOCK UP PROCESSOR
850 005202 004567 003426                      JSR      05,EXTMEN    ;SET UP BUFFER SIZES
851 005206 016767 173652 173632          MOV      0NRDCT,WRDCT
852 005214 012767 005234 173656          MOV      0LDAT,WRDCT
853 005222 012777 000340 173552          MOV      0340,0PS
854 005230 004567 002364          JSR      05,PASEL    ;SETUP FOR HARD ERROR
855 005234 004567 001614          LDAT: JSR      05,OPDSEL   ;LOCK UP PROCESSOR PRIORITY
856 005240 032767 040000 173574          BIT      0BIT14,FLAG ;SET UP DATA BUFFERS
857 005246 001416                      BEQ      SLH          ;SET UP DISK ADDRESS
858 005250 012767 014466 173600          MOV      0OUTBUF,BUF ;TEST FOR WRITE
859 005256 104503                      WRITE    +100          ;TEST FOR WRITE CHECK
860 005260 032777 001000 173512          BIT      0BIT9,0SWR  ;SETUP OUTPUT BUFFER
861 005266 001002                      BNE      WRWAIT        ;WRITE WITH INT, ENABLED
862 005270 000004                      IOT          ;FIND OUT HOW TO WAIT FOR INT
863 005272 000404                      BR      SLH          ;WAIT WITH WAIT INSTRUCTION
864 005274 016777 173540 173500 WRWAIT: MOV      SLH          ;WAIT IN BACKGROUND TEST
865 005302 000001                      WAIT
866 005304 032767 020000 173530 SLH: BIT      0BIT13,FLAG    ;WAIT FOR FLAG
867 005312 001421                      BEQ      ESH          ;TEST FOR WRITE CHECK
868 005314 012767 014466 173534          MOV      0OUTBUF,BUF ;TEST FOR READ
869 005322 012777 000340 173452          MOV      0340,0PS    ;SETUP OUTPUT BUFFER
870 005330 104507                      WRCHECK    +100
871 005332 032777 001000 173440          BIT      0BIT9,0SWR  ;WRITE CHECK WITH INT, ENABLE
872 005340 001002                      BNE      MCWAIT       ;FINDOUT HOW TO WAIT FOR INT.
873 005342 000004                      IOT          ;WAIT WITH WAIT INSTRUCTION
874 005344 000404                      BR      ESH          ;WAIT IN BACKGROUND TEST
875 005346 016777 173466 173426 MCWAIT: MOV      ESH          ;WAIT FOR FLAG
876 005354 000001                      WAIT
877 005356 032767 010000 173456 ESH: BIT      0BIT12,FLAG    ;TEST FOR READ
878 005364 001452                      BEQ      REH          ;CHECK BUFFER

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MAINDEC-11-DZRFB-B
DZRFBB,P11

RF11 DATA TEST REPLACES D50A

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879 005366 016767 173512 173462
880 005374 042767 000003 173440

MOV
BIC

INPUT,BUF
#3,FLAG

;SETUP INPUT BUFFER
;CLEAR RE-READ COUNT

001									
002	005402	012777	000340	173372	DSKRD:	MOV	#340,#PS		
003	005410	004567	003014			JSR	#5,ZBUF		;CLEAR BUFFER
004	005414	005267	173422			INC	FLAG		
005	005420	104505				READ	+100		;READ + INT ENABLE
006	005422	032777	001000	173350		BIT	#BIT9,#SWP		;FIND OUT HOW TO WAIT FOR INT.
007	005430	001002				BNE	RDWAIT		;WAIT WITH WAIT INSTRUCTION
008	005432	000004				IOT			
009	005434	000404				BR	ELH		
010	005436	016777	173376	173336	RDWAIT:	MOV	PRIORITY,#PS		;SET UP PRIORITY
011	005444	000001				WAIT			;WAIT FOR FLAG
012	005446	032777	010000	173324	ELH:	BIT	#BIT12,#SWP		
013	005454	001002				BNE	ADDR		
014	005456	004567	002430			JSR	#5,COMPARE		;COMPARE OUTBUFFER TO INBUFFER
015	005462	004567	003000		ADDR:	JSR	#5,OVRFLO		;TEST FOR EXTRA DATE BREAKS
016	005466	016767	173350	173412		MOV	FLAG,WORK		;CHECK DISK RE-READ COUNT
017	005474	042767	177774	173404		BIC	#177774,WORK		;DO 3 RE-READS.
018	005502	022767	000003	173376		CMP	#3,WORK		
019	005510	001334				BNE	DSKRD		;DO ANOTHER RE-READ
020	005512	032777	000400	173260	REH:	BIT	#BIT8,#SWP		
021	005520	001223				BNE	DATAT		
022	005522	004767	001514			JSR	#7,DISBUF		;GO SET UP DISK BUFFER.
023	005526	000642				BR	LDAT		
024	005530	005767	173306		MSTR:	TST	FLAG		
025	005534	100002				BPL	.+6		;UNDER PROGRAM CONTROL
026	005536	000167	000576			JMP	EXTPP		;OPERATOR SELECTED PATTERN
027	005542	062767	000002	173304		ADD	#2,PATNU		;INC PATTERN INDEX
028	005550	022767	000044	173276		CMP	#44,PATNU		
029	005556	001204				BNE	DATAT		;NOT LAST PATTERN EXIT
030	005560	005067	173270			CLR	PATNU		;LAST PATTERN EXIT


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911
912
913      ; THIS IS A RANDOM DATA, RANDOM ADDRESS
914      ; AND RANDOM WORD COUNT
915      ;
916      ; WORD COUNT CAN BE EQUAL TO OR LESS THAN 1000 WORDS
917      ;
918 005364 012767 177000 173310 RANEX: MOV      0-1000,PASSC
919 005372 012706 001000          MOV      $1000,$6
920 005376 042767 001000 173236      BIC      @BIT9,FLAG
921 005604 012767 006072 173266      MOV      @RANER,HRDR      ;SET UP FOR HARD ERROR
922 005612 016777 173222 173162      MOV      PRIORITY,@PS      ;SET PRIORITY TO LEVEL 5
923 005620 012767 000003 173260 WRLG:  MOV      $3,WORK      ;GENERATE RANDOM WORD
924 005626 012701 014466          MOV      @OUTBUF,$1
925 005632 004567 002062          JSR      $5,RANDOM
926 005636 042767 177000 006622      BIC      @177000,OUTBUF      ;MASK FOR WORD LENGTH=1A
927 005644 001765          BEQ      WRLG
928 005646 016767 006614 173172      MOV      OUTBUF,WRDCT      ;SET UP WORD COUNT
929 005654 016767 006610 173170      MOV      OUTBUF+2,DMA      ;SET UP DAR
930 005662 066767 173160 173162      ADD      WRDCT,DMA
931 005670 103753          BCS      WRLG
932 005672 016767 006572 173152      MOV      OUTBUF+2,DMA
933 005700 042767 177774 006564      BIC      @177774,OUTBUF+4
934 005706 016767 006560 173134      MOV      OUTBUF+4,TRACK      ;SET UP DAE
935 005714 016767 173126 173164      MOV      WRDCT,WORK      ;GENERATE RANDOM
936 005722 012701 014466          MOV      @OUTBUF,$1      ;DATA BUFFER
937 005726 004567 001766          JSR      $5,RANDOM
938 005732 012767 014466 173116      MOV      @OUTBUF,BUF
939 005740 052777 000400 173046      BIS      @BIT8,@DCS      ;CLEAR THE DISK
940 005746 104503          WRITE      +100      ;WRITE DATA
941 005750 032777 001000 173022      BIT      @BIT9,@SWR
942 005756 001002          BNE      .+6
943 005760 000004          IOT
944 005762 000404          BR      .+12
945 005764 016777 173050 173010      MOV      PRIORITY,@PS
946 005772 000001          WAIT
947 005774 104507          WRCHECK +100      ;WRITE CHECK DATA
948 005776 032777 001000 172774      BIT      @BIT9,@SWR
949 006004 001002          BNE      .+6
950 006006 000004          IOT
951 006010 000404          BR      .+12
952 006012 016777 173022 172762      MOV      PRIORITY,@PS
953 006020 000001          WAIT
954 006022 016767 173056 173026      MOV      INPUT,BUF      ;SET UP BUFFER
955 006030 004567 002374          JSR      $5,ZBUF      ;CLEAR BUFFER AREA
956 006034 104505          READ      +100      ;READ DATA
957 006036 032777 001000 172734      BIT      @BIT9,@SWR
958 006044 001002          BNE      .+6
959 006046 000004          IOT
960 006050 000404          BR      .+12
961 006052 016777 172762 172722      MOV      PRIORITY,@PS
962 006060 000001          WAIT
963 006062 004567 002024          JSR      $5,COMPARE      ;COMPARE OUT BUFFER TO IN BUFFER
964 006066 004567 002374          JSR      $5,OVRFLO      ;TEST FOR EXTRA DATA BREAKS

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965	006072	032767	001000	172742	RANER:	BIT	%BIT9,FLAG	;CHECK FOR ERROR
966	006100	001430				BEQ	EXRAX	
967	006102	042767	001000	172732		BIC	%BIT9,FLAG	
968	006110	004567	004620			JSR	%5,CONV	
969	006114	001052				DMA		
970	006116	013567				MES1		
971	006120	000006				6		
972	006122	004567	004606			JSR	%5,CONV	
973	006126	001050				TRACK		
974	006130	013603				MES1A		
975	006132	000002				2		
976	006134	004567	004574			JSR	%5,CONV	
977	006140	001046				WRDCT		
978	006142	013646				MES3		
979	006144	000004				4		
980	006146	104000				EMT+0		
981	006150	013553				HED6		
982	006152	013603				MES1A		
983	006154	013567				MES1		
984	006156	013646				MES3		
985	006160	177777				-1		
986	006162	005267	172714		EXRAX:	INC	PASSC	;HAVE WE DONE IT 1000 TIMES
987	006166	001214				BNE	WRLG	;BRANCH IF NO
988	006170	032777	004000	172602		BIT	%BIT11,%8WR	;LOOP ON TEST
989	006176	001402				BEQ	..+6	;BRANCH IF YES
990	006200	000167	177360			JMP	RANEX	

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998 006204 005067 172642
999 006210 005067 172634
1000 006214 032767 004000 172620
1001 006222 001432
1002 006224 016767 172612 172654
1003 006232 042767 177743 172646
1004 006240 026767 172642 172630
1005 006246 001420
1006 006250 016703 172632
1007 006254 000241
1008 006256 006003
1009 006260 022763 000020 013426
1010 006266 101004
1011 006270 062767 000004 172544
1012 006276 000752
1013 006300 062767 000004 172534
1014 006306 000414
1015 006310 104001
1016 006312 014347
1017 006314 042767 000034 172520
1018 006322 013700 000042
1019 006326 001404
1020 006330 004710
1021 006332 000240
1022 006334 000240
1023 006336 000240
1024 006340 000167 173512
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1030 006344 016705 172456
1031 006350 016745 172474
1032 006354 016767 172462 172524
1033 006362 042767 177743 172516
1034 006370 056715 172512
1035 006374 016745 172452
1036 006400 016745 172452
1037 006404 016745 172436
1038 006410 005115
1039 006412 005215
1040 006414 011604
1041 006416 014467 172464
1042 006422 042767 177600 172456
1043 006430 016745 172452
1044 006434 000002

;
;CHECK FOR MULTI DISK MODE
;IF IN MULTI DISK MODE REPORT "END"
;IF LAST DISK ON SYSTEM HAS BEEN
;EXERCISED.
;
;
CLR DNR
CLR TRACK
BIT 0BIT11,FLAG ;ARE WE IN MULTI DISK MODE
BEQ REPOEN ;REPORT "END"
CHKDOS: MOV FLAG,WORK ;WHAT DISK ARE WE ON
BIC 0177743,WORK ;IF LAST DISK ON SYSTEM
CMP WORK,DSKNOR ;REPORT END
BEQ REPOEN ;REPORT "END" LAST DISK
MOV WORK,%3 ;SET UP INDEX POINTER
CLC
ROH %3
CMP 020,TABLE(3) ;WHAT IS ERROR COUNT?
BHI DRIVEROK ;LESS THAN 20(8)-CONTINUE
ADD 04,FLAG
BR CHKDOS
DRIVEROK: ADD 04,FLAG ;INC. DISK NO.
BR EXTPP ;EXERCISE DISK
REPOEN: EMT +1 ;REPORT END OF PASS
END
BIC 034,FLAG
MOV 0042,%0 ;HAS THIS A MONITOR LOAD?
BEQ EXTPP ;NO - RECYCLE
LOGICAL: JSR 07,(0)
NOP
NOP
NOP
EXTPP: JMP ADTST ;RECYCLE
;
;ENTER DISK HANDLER BY THE TRAP INSTRUCTION
;ARGUMENT TO TRAP INSTRUCTION IS TWO ORDER
;BYTE OF THE CONTROL REGISTER.
;
DISK: MOV DBR,%5 ;SET UP TO LOAD DISK REG
MOV TRACK,-(5) ;LOAD TRACK NUMBER
MOV FLAG,WORK ;SET UP DISK NO.
BIC 0177743,WORK ;MASK FORM PROGRAM FLAG
BIS WORK,(5) ;LOAD UNIT INTO DAE
MOV DNR,-(5) ;LOAD WORD ADDRESS
MOV BUF,-(5) ;SET UP CURRENT ADDRESS
MOV WRDCT,-(5) ;LOAD WORD COUNT
COM (5) ;SET UP TWO'S COMPLEMENT
INC (5)
MOV (6),%4
MOV -(4),WORK
BIC 0177600,WORK ;MASK FUNCTION BITS
MOV WORK,-(5) ;LOAD FUNCTION REG.
RTI ;RETURN FROM TRAP

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E4

1082								
1083	006576	017767	172220	172302	DELHES:	MOV	@DAR,WORK	;SET UP LOWER 16 BITS OF ADDR.
1084	006604	005367	172276			DEC	WORK	
1085	006610	004567	004120			JSR	%5,CONV	;CONVERT TO ASCII
1086	006614	001106				WORK		
1087	006616	013567				MES1		
1088	006620	000006				6		
1089	006622	104000				ENT+0		
1090	006624	013603				MES1A		
1091	006626	013567				MES1		
1092	006630	177777				-1		
1093	006632	017767	172156	172246		MOV	@DC8,WORK	;SET UP STATUS
1094	006640	004567	004070			JSR	%5,CONV	
1095	006644	001106				WORK		
1096	006646	013613				MES2		
1097	006650	000006				6		
1098	006652	104001				ENT+1		
1099	006654	013613				MES2		
1100	006656	032777	040000	172130		BIT	@BIT14,@DC8	;TEST FOR HARD ERROR
1101	006664	001435				BEG	SOFTER	;GO AND CONTINUE SOFT ERROR
1102	006666	017767	172132	172212		MOV	@DAE,WORK	;FETCH ERROR EXT. BITS
1103	006674	000367	172206			SWAB	WORK	
1104	006700	042767	177400	172200		BIC	@177400,WORK	
1105	006706	004567	004022			JSR	%5,CONV	;CONVERT TO ASCII
1106	006712	001106				WORK		
1107	006714	013627				MES2A		
1108	006716	000003				3		
1109	006720	104000				ENT+0		
1110	006722	013534				MES2A		
1111	006724	013627				MES2A		
1112	006726	177777				-1		
1113	006730	052777	000400	172056		BIS	@BIT8,@DC8	;CLEAR THE DISK
1114	006736	012706	001000			MOV	@1000,%6	
1115	006742	032777	002000	172030		BIT	@BIT10,@SWR	;HALT ON ERROR
1116	006750	001401				BEG	..+4	
1117	006752	000000				HALT		;YES HALT BIT 10 SET IN SWR
1118	006754	000177	172120			JMP	@HRDR	;EXIT HARD ERROR
1119	006760	005777	172032		SOFTER:	TST	@WC	;CHECK FOR X-FER DONE
1120	006764	001417				BEG	INTEXT	;EXIT FROM ROUTINE
1121	006766	032777	001000	172004		BIT	@BIT9,@SWR	
1122	006774	001402				BEG	..+6	
1123	006776	162716	000002			SUB	@2,(6)	;X-FER NOT DONE SET UP FOR RETURN
1124	007002	032777	002000	171770		BIT	@BIT10,@SWR	;HALT ON ERROR
1125	007010	001401				BEG	..+4	
1126	007012	000000				HALT		;YES HALT BIT10 SET IN SWR
1127	007014	052777	000001	171772		BIS	@BIT0,@DC8	;SET GO AND CONTINUE
1128	007022	000002				RTI		;RETURN TO WAIT INSTR.
1129								
1130								
1131	007024	032777	020000	171746	INTEXT:	BIT	@BIT13,@SWR	;HALT ON COMPLETION FLAG
1132	007032	001401				BEG	..+4	
1133	007034	000000				HALT		;YES BIT 13 SET IN SWR HALT
1134	007036	032777	001000	171734		BIT	@BIT9,@SWR	
1135	007044	001002				BNE	..+6	

MAINDEC-11-DZRFB-B
DZRFBB,P11

RF11 DATA TEST REPLACES D50A

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1136 007046 012706 000774
1137 007052 000002

MOV
RTI

8774.86

,RESET STACK
,EXIT

H-9

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1173
1174
1175      ;
1176      ;ROUTINE TO SETUP DISK BUFFERS
1177      ;ADD WORD COUNT TO STARTING DISK ADDRESSES
1178      ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
1179      ;
1179 007242 066767 171600 171602 DISBUF: ADD      WRDCT,DNA      ;ADD WORD COUNT TO LOWER 16 BITS
1180 007250 103002          BCC      CONDA      ;
1181 007252 005267 171572          INC      TRACK      ;OVERFLOW ADD ONE TO TRACK
1182 007256 026777 171570 171536 CONDA:  CMP      DNA,0DAR    ;COMPARE LOWER 16 BITS
1183 007264 001403          BEQ      CHDAE      ;
1184 007266 052767 000100 171546          BIS      0BIT6,FLAG
1185
1186 007274 017767 171524 171606 CHDAE:  MOV      0DAE,WORK1    ;FETCH EXT. ADDR BITS
1187 007302 042767 177740 171600          BIC      0177740,WORK1 ;MASK TRACK AND DISK ADDR
1188 007310 016767 171526 171570          MOV      FLAG,WORK      ;SET UP DISK ADDRESS
1189 007316 042767 177743 171562          BIC      0177743,WORK
1190 007324 066767 171520 171554          ADD      TRACK,WORK
1191 007332 042767 177740 171546          BIC      0177740,WORK
1192 007340 026767 171542 171542          CMP      WORK,WORK1    ;ARE THEY EQUAL
1193 007346 001066          BNE      ERADR      ;ERROR IN DAE REG
1194 007350 105767 171466          TSTB     FLAG      ;CHECK FOR LAST DISK BUFFER
1195 007354 100015          BPL      EXTCHE
1196 007356 005067 171470          CLR      DNA      ;CLEAR LOWER 16 BITS
1197 007362 005067 171462          CLR      TRACK    ;CLEAR EXT. ADDR. BITS.
1198 007366 042767 000200 171446          BIC      0200,FLAG
1199 007374 062716 000002          ADD      02,(6)      ;INC STOCK POINTER
1200 007400 016767 171460 171440          MOV      0WRDCT,WRDCT
1201 007406 000445          BR      EXTDR      ;EXIT
1202 007410 042767 177774 171472 EXTCHE: BIC      0177774,WORK1    ;MASK EXT. TRACK BITS
1203 007416 022767 000003 171464          CMP      03,WORK1    ;COMPARE FOR LAST TRACK
1204 007424 001021          BNE      AKH      ;NOT LAST TRACK EXIT
1205 007426 017767 171370 171452          MOV      0DAR,WORK    ;FETCH LOWER 16 BITS OF ADDRESS
1206 007434 066767 171406 171444          ADD      WRDCT,WORK    ;WILL DISK OVERFLOW
1207 007442 103012          BCC      AKH
1208 007444 052767 000200 171370          BIS      0200,FLAG
1209 007452 017767 171344 171366          MOV      0DAR,WRDCT    ;DISK WILL OVERFLOW
1210 007460 005167 171362          COM      WRDCT    ;SET UP NEW WORD COUNT
1211 007464 005267 171356          INC      WRDCT    ;MAKE TWO'S COMP.
1212 007470 017767 171330 171352 AKH:   MOV      0DAE,TRACK
1213 007476 042767 177774 171344          BIC      0177774,TRACK  ;MASK TRACK BITS
1214 007504 017767 171312 171340          MOV      0DAR,DNA      ;LOWER 16 BITS OF ADDRESS
1215 007512 032767 000100 171322          BIT      0BIT6,FLAG    ;REPORT ADDRESS ERROR
1216 007520 001001          BNE      .+4
1217 007522 000207          EXTDR:  RTS      07      ;EXIT
1218 007524 004567 003204          ERADR:  JSR      05,CONV    ;CONVERT DNA REG COUNT TO ASCII
1219 007530 001052          DNA
1220 007532 013567          MES1
1221 007534 000006          6
1222 007536 004567 003172          JSR      05,CONV    ;CONVERT TRACK REG COUNT TO ASCII
1223 007542 001110          WORK1
1224 007544 013603          MES1A
1225 007546 000002          2
1226 007550 104000          ENT      +0      ;REPORT ERROR

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1227	007552	013516		HED4		
1228	007554	013603		MES1A		
1229	007556	013567		MES1		
1230	007560	177777		-1		
1231	007562	004767	003616	JSR	07,INCTAB	;INC ERROR COUNT
1232	007566	042767	000100 171246	BIC	0BIT6,FLAG	
1233	007574	005087	171252	CLR	DNA	;DISK ADDRESS ERROR RE-START PROG.
1234	007600	005067	171244	CLR	TRACK	
1235	007604	032777	002000 171166	RIT	0BIT10,0SWR	;HALT ON ERROR
1236	007612	001401		BEQ	.+4	
1237	007614	000000		HALT		;SWITCH 10 SET IN SWR HALT
1238	007616	000207		RTS	07	

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1250 007620 016767 171230 003166 PASEL: MOV PATNU,ACNVX ;SET UP PATTERN NUMBER
1251 007626 006067 003162 NOR ACNVX ;NORMALIZE
1252 007632 004567 003076 JSR 85,CONV ;CONVERT TO ASCII
1253 007636 013014 ACNVX
1254 007640 014401 PATHES
1255 007642 000002 Z ;PRINT CURRENT PATTERN
1256 007644 104000 ENT+0
1257 007646 014405 PATHED
1258 007650 014401 PATHES
1259 007652 177777 -1
1260 007654 016700 171174 MOV PATNU,80
1261 007660 016767 171162 171220 MOV WRDCT,WORK ;SET UP WORK
1262 007666 012701 014466 MOV OUTBUF,81 ;LOC. OF OUTBUFFER
1263 007672 022700 000042 CMP 842,80 ;TEST FOR RANDOM DATA NUMBER
1264 007676 001410 BEQ RANDOM ;GO GENERATE RANDOM DATA
1265 007700 016021 010050 FILDAT: MOV PAT0(0),(1)+ ;FILL BUFFER
1266 007704 005367 171176 DEC WORK ;DEC. WORK COUNT
1267 007710 005767 171172 TST WORK ;TEST FOR LAST WORK
1268 007714 001371 BNE FILDAT ;LOAD NEXT WORD
1269 007716 000205 RTS 85 ;BUFFER FULL
1270
1271 ;RANDOM DATA
1272
1273
1274
1275
1276 ;RANDOM DATA GENERATOR SUBROUTINE
1277 007720 016700 000120 RANDOM: MOV LONUM,80 ;SET UP R0 WITH 5 DIGITS LOW
1278 007724 016704 000116 MOV HINUM,84 ;SET UP R1 WITH 5 DIGITS HIGH
1279 007730 012703 000007 MOV 87,83 ;SET UP SHIFT COUNT
1280 007734 005002 CLR 82 ;CLEAR R2
1281 007736 006300 SHIFT: ASL 80 ;SHIFT R0 LEFT AND
1282 007740 006104 ROL 84 ;ROTATE CARRY INTO LSB OF R1 INTO
1283 007742 006102 ROL 82 ;ROTATE CARRY OUT OF R1 INTO R2
1284 007744 005303 DEC 83 ;DECREMENT R3
1285 007746 001373 BNE SHIFT ;CONTINUE SHIFT LOOP
1286 007750 066700 000070 ADD LONUM,80 ;ADDN IN NUMBER TO MAKE X 129
1287 007754 005504 ADC 84 ;PROPOGATE CARRY
1288 007756 066704 000064 ADD HINUM,84 ;ADDN IN NUMBER TO MAKE X 129
1289 007762 005502 ADC 82 ;PROPOGATE CARRY
1290 007764 062700 001057 ADD 81057,80 ;ADDN LOW CONSTANT
1291 007770 005504 ADC 84 ;PROPOGATE CARRIES
1292 007772 005502 ADC 82 ;PROPOGATE AGAIN

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1293	007774	062704	047401	ADD	047401,04	;ADDN HIGH CONSTANT
1294	010000	005502		ADC	02	;PROPOGATE CARRY
1295	010002	062702	000006	ADD	06,02	;ADDN HIGHEST CONSTANT
1296	010006	060200		ADD	02,00	;REPRIME R0 WITH HIGH DIGIT
1297	010010	005504		ADC	04	;PROPOGATE CARRY
1298	010012	010067	000026	MOV	00,LONUM	;PUT R0 BACK IN LONUM
1299						
1300	010016	010021		MOV	00,(1)+	;HOLD LONUM FOR PROGRAM
1301	010020	005367	171062	DEC	WORK	
1302	010024	001406		BEG	EXGEN	
1303	010026	010467	000014	MOV	04,HINUM	;PUT R1 BACK IN HINUM
1304	010032	010421		MOV	04,(1)+	;HOLD HINUM FOR PROGRAM
1305	010034	005367	171046	DEC	WORK	
1306	010040	001327		BNE	RANDOM	
1307	010042	000205		RTS	05	;RETURN T PROGRAM
1308	010044	000000				
1309	010046	000000				
1310						
1311						
1312						
1313						
1314						
1315						
1316						

EXGEN: 0
LONUM: 0
HINUM: 0

;
;
;
;
;
;
;

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1322 010050 000000
1323 010052 177777
1324 010054 134510
1325 010056 043267
1326 010060 100000
1327 010062 107070
1328 010064 070707
1329 010066 052525
1330 010070 125252
1331 010072 177737
1332 010074 004102
1333 010076 136363
1334 010100 063636
1335 010102 000001
1336 010104 100005
1337 010106 000520
1338 010110 030303
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1350 010112 005067 170774
1351 010116 012767 014466 170744
1352 010124 016767 170754 170740
1353 010132 027777 170732 170732
1354 010140 001016
1355 010142 005267 170744
1356 010146 026767 170674 170736
1357 010154 001407
1358 010156 062767 000002 170704
1359 010164 062767 000002 170700
1360 010172 000757
1361 010174 000205
1362

                                .EVEN
                                I
                                ;RF11 DATA PATTERNS
                                I
                                PAT0: 0
                                PAT1: 177777
                                PAT2: 134510
                                PAT3: 043267
                                PAT4: 100000
                                PAT5: 107070
                                PAT6: 070707
                                PAT7: 052525
                                PAT10: 125252
                                PAT11: 177737
                                PAT12: 004102
                                PAT13: 136363
                                PAT14: 063636
                                PAT15: 000001
                                PAT16: 100005
                                PAT17: 000520
                                PAT20: 030303
                                ;PAT21 RANDOM DATA
                                I
                                I
                                I
                                ;DATA COMPARISON ROUTINE
                                ;IF AN ERROR OCCURS BETWEEN THE OUT-BUFFER AND
                                ;THE IN-BUFFER AN ERROR WILL BE REPORTED IN THE
                                ;FOLLOWING MANNER
                                ;DATA ERROR XX DAE XXXXXX DAE XXXXXX GOOD DATA XXXXXX BAD DATA
                                I
                                I
                                ;COMPARE:CLR      WORK2      ;WORD COUNT
                                ;MOV      0OUTBUF,SAVE    ;SET UP OUTBUFFER POINTER
                                ;MOV      INPUT,SAVE1     ;SET UP IN BUFFER POINTER
                                WRDCHP: CMP      0SAVE,0SAV1 ;COMPARE BUFFERS
                                ;BNE      WDERR          ;WORD IN ERROR
                                WRDINC: INC      WORK2      ;+1 WORD COUNT
                                ;CMP      WRDCT,WORK2     ;IS COMPLETE BUFFER CHECKED
                                ;BEQ      ADAM            ;EXIT ROUTINE
                                ;ADD      02,SAVE
                                ;ADD      02,SAVE1
                                ;BR       WRDCHP
                                ADAM:  RTS      RS
                                I
                                ;COMPARE NEXT WORD
                                ;EXIT THIS ROUTINE

```

1363									
1364	010176	052767	001000	170636	WDERR:	RIS	#BIT9,FLAG		;SET ERROR BIT
1365	010204	004767	003174			JSR	#7,INCTAB		;INC. ERROR COUNT
1366	010210	016767	170636	170670		MOV	DMA,WORK		;FETCH STARTING DISK ADDR
1367	010216	016767	170626	170664		MOV	TRACK,WORK1		
1368	010224	066767	170662	170654		ADD	WORK2,WORK		;CALCULATE FAILING ADDR
1369	010232	103002				HCC	,+6		;SHOULD DAE BE INCREMENTED
1370	010234	005267	170650			INC	WORK1		
1371	010240	016767	170576	170646		MOV	FLAG,WORK3		
1372	010246	042767	177743	170640		BIC	#177743,WORK3		
1373	010254	056767	170634	170626		BIS	WORK3,WORK1		
1374	010262	004567	002446			JSR	#5,CONV		;CONVERT WORD ADDR TO ASCII
1375	010266	001106				WORK			
1376	010270	013567				MES1			
1377	010272	000006				6			
1378	010274	004567	002434			JSR	#5,CONV		;CONVERT TRACK ADDR TO ASCII
1379	010300	001110				WORK1			
1380	010302	013603				MES1A			
1381	010304	000002				2			
1382	010306	017767	170556	170572		MOV	#SAVE,WORK		;FETCH GOOD DATA
1383	010314	004567	002414			JSR	#5,CONV		;CONVERT GOOD DATA TO ASCII
1384	010320	001106				WORK			
1385	010322	013704				MES5			
1386	010324	000006				6			
1387	010326	017767	170540	170552		MOV	#SAV1,WORK		;FETCH BAD DATA
1388	010334	004567	002374			JSR	#5,CONV		;CONVERT TO ASCII
1389	010340	001106				WORK			
1390	010342	013724				MES6			
1391	010344	000006				6			
1392	010346	016767	170470	170532		MOV	FLAG,WORK		;WHICH READ THE
1393	010354	042767	177774	170524		BIC	#177774,WORK		;ERROR OCCURRED ON
1394	010362	004567	002346			JSR	#5,CONV		
1395	010366	001106				WORK			
1396	010370	014017				MES13			
1397	010372	000001				1			
1398	010374	104000				ENT	+0		;PRINT MESSAGE
1399	010376	013452				HED1			
1400	010400	014017				MES13			
1401	010402	013603				MES1A			
1402	010404	013567				MES1			
1403	010406	013704				MES5			
1404	010410	013724				MES6			
1405	010412	177777				-1			
1406	010414	032777	002000	170356		BIT	#BIT10,#SWR		;HALT ON ERROR
1407	010422	001401				BEQ	,+4		
1408	010424	000000				HALT			;YES HALT BIT 10 SET IN SWR
1409	010426	000645				BR	WRDINC		;GO COMPARE NEXT WORD
1410									
1411									
1412									
1413									
1414									
1415									

AS

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1416
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1422 010430 016704 170450
1423 010434 016767 170424 170452
1424 010442 006167 170446
1425 010446 060467 170442
1426 010452 020467 170436
1427 010456 001001
1428 010460 000205
1429 010462 005024
1430 010464 000772
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1439 010466 016704 170354
1440 010472 006104
1441 010474 066704 170404
1442 010500 016767 170360 170406
1443 010506 006167 170402
1444 010512 066767 170366 170374
1445 010520 020467 170370
1446 010524 001001
1447 010526 000205
1448 010530 005724
1449 010532 001772
1450 010534 052767 001000 170300
1451 010542 010467 002246
1452 010546 162767 000002 002240
1453 010554 004567 002154
1454 010560 013014
1455 010562 013663
1456 010564 000006
1457 010566 010467 002222
1458 010572 162767 000002 002214
1459 010600 017767 002210 002206
1460 010606 004567 002122
1461 010612 013014
1462 010614 013724
1463 010616 000006
1464 010620 104000
1465 010622 013502
1466 010624 013663
1467 010626 013724
1468 010630 177777
1469 010632 000732

;
;ROUTINE TO ZERO DATA INPUT BUFFER
;ZERO BUFFER BEFORE READING
;
;
ZBUF:  MOV     INPUT,%4           ;FETCH START OF INBUFFER
        MOV     SWRDCT,WORK3
        ROL     WORK3
        ADD     %4,WORK3
NZUF:  CMP     %4,WORK3           ;IS ROUTINE COMP.
        BNE     CLEAR            ;ZERO NEXT WORD
        RTS     %5               ;EXIT ROUTINE
CLEAR:  CLR     (4)+              ;CLEAR THE WORD
        BR      NZUF

;
;
;ROUTINE TO TEST FOR ADDITIONAL DATA TRANSFERS
;ANY DATA TRANSFERRED AFTER WORD COUNT OVERFLOW IS AN ERROR
;
;
OVRFLO: MOV     WRDCT,%4           ;ADD WORD COUNT
        ROL     %4
        ADD     INPUT,%4
        MOV     SWRDCT,WORK3
        ROL     WORK3
        ADD     INPUT,WORK3
CHWRD:  CMP     %4,WORK3           ;IS TEST COMPLETE
        BNE     CKNEX            ;CHECK NEXT WORD
        RTS     %5               ;TEST IS COMPLETE
CKNEX:  TST     (4)+              ;TEST FOR ZERO WORD
        BEQ     CHWRD            ;WORD IS ZERO
        BIS     @BIT9,FLAG        ;SET ERROR BIT
        MOV     %4,ACNVX
        SUB     %2,ACNVX
        JSR     %5,CONV           ;CONVERT ; OCTAL TO ASCII
                                    ;ADDRESS
        MOV     %4,ACNVX
        SUB     %2,ACNVX
        MOV     @ACNVX,ACNVX
        JSR     %5,CONV           ;CONVERT OCTAL TO ASCII
                                    ;DATA
        ENT     %0                ;CALL TYPE OUT ROUTINE
        HED3
        MES4
        MES6
        -1
        BR      CHWRD            ;FETCH NEXT WORD

```

1470
1471
1472
1473
1474
1475

;
;
;
;
;
;


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1476
1477      ;EXTENDED MEMORY EXERCISER
1478      ;THE PROGRAM DETERMINES HOW MUCH MEMORY
1479      ;IS ON THE SYSTEM THEN IT
1480      ;
1481      010634 052777 000400 170152 EXTMEN: BIS      @BIT0,@DCS      ;CLEAR THE DISK
1482      010642 013767 000042 170220      MOV      @@42,SAVE      ;GET MONITOR ADDRESS
1483      010650 001410      BEQ      18      ;SKIP IF 0
1484      010652 100432      BHI      LGMEM      ;GREATER THAN 16K
1485      010654 162767 000020 170206      SUB      @20,SAVE      ;DEC IT
1486      010662 022767 014466 170200      CMP      @OUTBUF,SAVE      ;IS IT ACT 11
1487      010670 100432      BHI      GOTMEM      ;NO - SKIP
1488      010672 012767 010750 167104 18:      MOV      @MAXREF,4      ;SET UP I/O BUS TRAP
1489      010700 012767 000340 167100      MOV      @340,6
1490      010706 012767 017446 170154      MOV      @17446,SAVE      ;SET UP FOR 4K
1491      010714 005777 170150      EXREF: TST      @SAVE      ;REFERENCE MEMORY
1492      010720 022767 177446 170142      CMP      @177446,SAVE      ;TEST FOR GREATER THAN 28K
1493      010726 001410      BEQ      MAXREF      ;LAST REFERENCE MADE TO I/O REG.
1494      010730 062767 020000 170132      ADD      @20000,SAVE      ;SET UP FOR NEXT MEMORY REF.
1495      010736 000766      BH      EXREF      ;GO REFERENCE MEMORY
1496      010740 162767 000020 170122 LGMEM: SUB      @20,SAVE      ;DEC IT
1497      010746 000403      BR      GOTMEM
1498      ;
1499      ;ENTER HERE WHEN I/O BUS ERROR OCCURS
1500      ;
1501      010750 162767 020000 170112 MAXREF: SUB      @20000,SAVE
1502      010756 012767 000006 167020 GOTMEM: MOV      @6,4      ;RESTORE I/O BUS TRAP
1503      010764 005067 167016      CLR      6
1504      010770 012706 000776      MOV      @776,@6
1505      010774 162767 014466 170066      SUB      @OUTBUF,SAVE      ;SET UP NEW WORD COUNT
1506      011002 006067 170062      ROR      SAVE
1507      011006 042767 000001 170054      BIC      @BIT0,SAVE
1508      011014 016767 170050 170042      MOV      SAVE,SWRDCT
1509      011022 006067 170036      ROR      SWRDCT
1510      011026 016767 170032 170012      MOV      SWRDCT,WRDCT
1511      011034 012767 014466 170042      MOV      @OUTBUF,INPUT
1512      011042 066767 170022 170034      ADD      SAVE,INPUT
1513      011050 000205      RTS      @5

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1514
1515
1516      I
1517      ;BACKGROUND TEST FOR INTERRUPTS
1518      I
1518      011052 012767 011202 166734 XWAIT: MOV      RTIX,14      ;SET UP TRACE TRAP
1519      011060 005067 166732      CLR      16
1520      011064 012767 177000 170002      MOV      8-1000,PASS      ;SET UP TIME BASE
1521      011072 012737 011114 000010      MOV      818,810      ;SET ILLEGAL INST
1522      011100 006727 000000      SXT      80      ;TEST FOR 11/45
1523      011104 012767 000006 000070      MOV      86,RTIX      ;MAKE IT AN RTT
1524      011112 000401      BR      28      ;SKIP JUNK
1525      011114 022626      18:      CMP      (6)+,(6)+      ;CLEAR STACK
1526      011116 012737 000012 000010      28:      MOV      812,810      ;RESET I/O
1527      011124 012746 000020      MOV      8BIT4,-(6)      ;SET TRACE TRAP BIT
1528      011130 012746 011136      MOV      8,+6,-(6)
1529      011134 000002      RTI      ;RETURNS TO NEXT LOCATION WITH T BIT SET
1530      011136 005027 000000      CLR      80
1531      011142 005267 177772      XINCW: INC      XINCW-2
1532      011146 105767 177766      TSTB     XINCW-2
1533      011152 100373      BPL      XINCW
1534      011154 005267 167714      INC      PASS
1535      011160 001401      BEQ      ,+4
1536      011162 000765      BR      XINCW-4
1537      ;REPORT BACKGROUND TEST TIMED OUT
1538      011164 005046      CLR      -(6)      ;CLEAR PS ON STACK
1539      011166 012746 011174      MOV      818,-(6)
1540      011172 000002      RTI      ;SET RETURN
1541      011174 104001      18:      EMT+1      ;CLEAR TRACE BIT
1542      011176 014027      TIMO
1543      011200 000000      HALT
1544      I
1545      011202 000002      RTIX: RTI

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1546
1547      ;RF11 POWER FAIL TEST *1
1548      ;      DISK ZERO
1549      ;      WRITE COMPLETE DISK WITH 125252 PATTERN
1550      ;      REPORT "OK"
1551      ;START WRITING THE SAME PATTERN
1552      ;WHEN POWER FAIL OCCURS ABORT TRANSFER
1553      ;SETUP NEW ENTRY POINT AND HALT
1554      ;
1555      ;POWER UP AND WRITE CHECK THE DISK FOR ERRORS
1556      ;
1557      ;***ONLY ONE ERROR IS CONSIDERED ACCEPTABLE***
1558      ;
1559      ;
1560      011204 012706 001000      PFT1:  MOV      $1000,$6      ;SET UP STACK
1561      011210 004767 000406      JSR      $7,POWFAL      ;WRITE 125252 ON DISK
1562      011214 052777 000400 167572  PFWAT:  BIS      @BIT9,@DCS      ;CLEAR DISK
1563      011222 005067 167624      CLR      DMA
1564      011226 005067 167616      CLR      TRACK
1565      011232 012767 011214 167640      MOV      @PFWAT,HRDEN      ;SET UP FOR HARD ERROR
1566      011240 012767 011376 166556      MOV      @DOWN,24      ;SET UP POWER FAIL VEC.
1567      011246 012767 000340 166552      MOV      $340,26
1568      011254 104503      MYBYWR:  WRITE    +100
1569      011256 032777 001000 167514      BIT      @BIT9,@SWR
1570      011264 001002      BNE      .+6
1571      011266 000004      IOT
1572      011270 000404      BR      .+12
1573      011272 016777 167542 167502      MOV      PRIORITY,@PS
1574      011300 000001      WAIT
1575      011302 004767 175734      JSR      $7,DISBUF      ;SET UP NEW DISK BUFFER
1576      011306 000762      BR      MYBYWR
1577      011310 000741      BR      PFWAT
1578      ;ROUTINE TO CHECK DATA AFTER POWER FAIL
1579      ;
1580      011312 052777 000400 167474  UPCHK:  BIS      @BIT9,@DCS      ;CLEAR THE DISK
1581      011320 005067 167526      CLR      DMA
1582      011324 005067 167520      CLR      TRACK
1583      011330 012767 011312 167542      MOV      @UPCHK,HRDER      ;SET UP FOR HARD ERROR
1584      011336 104507      CHKDAT:  WRCHECK  +100
1585      011340 032777 001000 167432      BIT      @BIT9,@SWR
1586      011346 001002      BNE      .+6
1587      011350 000004      IOT
1588      011352 000404      BR      .+12
1589      011354 016777 167460 167420      MOV      PRIORITY,@PS
1590      011362 000001      WAIT
1591      011364 004767 175652      JSR      $7,DISBUF      ;SET UP NEW DISK BUFFER
1592      011370 000762      BR      CHKDAT
1593      011372 000167 177616      JMP      PFWAT      ;GO WAIT FOR ANOTHER
1594      ;POWER FAIL

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1599
1600
1601 011376 052777 000400 167410 DOWN: BIS #BIT8,ADCS ;ABORT DISK
1602 011404 012767 011414 166412 MOV #UP,24 ;SET POWER FAIL VECTOR
1603 011412 000000 HALT
1604
1605 011414 012767 011376 166402 UP: MOV #DOWN,24
1606 011422 012706 001000 MOV #1000,86
1607 011426 104001 ENT+1
1608 011430 014325 PWRFL
1609 011432 004767 000142 JSR #7,DELAY
1610 011436 000167 177650 JMP UPCHK ;GO CHECK DISK
1611
1612
1613
1614
1615
1616
1617 ;POWER FAIL TEST #2
1618 ;DISK ZERO
1619 ;WRITE COMPLETE DISK WITH 125252 PATTERN
1620 ;REPORT "OK"
1621 ;WRITE CHECK DISK AND WAIT FOR POWER FAIL
1622 ;WHEN POWER COMES BACK WRITE CHECK DISK AGAIN
1623 ;AND CHECK FOR ERRORS
1624 ;***NO ERRORS SHOULD OCCUR***
1625
1626 ;DO NOT CREATE ANOTHER POWER FAIL UNTIL
1627 ;THE ADDRESS REGISTER HAS COMPLETELY CYCLED
1628 ;THROUGH.
1629
1630 011442 012706 001000 PFT2: MOV #1000,86 ;SET UP STACK
1631 011446 004767 000150 JSR #7,POWFAL ;WRITE 125252 ON DISK
1632 011452 005067 167374 PWRFL: CLR DHA
1633 011456 005067 167366 CLR TRACK
1634 011462 012767 011452 167410 MOV #PWRFL,HRDER ;SET UP HARD ERROR
1635 011470 012767 011542 166326 MOV #PWRDN,24 ;SET UP POWER FAIL VEC.
1636 011476 012767 000340 166322 MOV #340,26
1637 011504 104507 CHKDSK: WRCHECK +100
1638 011506 032777 001000 167264 BIT #BIT9,0SWR
1639 011514 001002 BNE .+6
1640 011516 000004 IOT ;WAIT IN BACKGROUND
1641 011520 000404 BR .+12
1642 011522 016777 167312 167252 MOV #PRIORITY,0PS
1643 011530 000001 WAIT
1644 011532 004767 175504 JSR #7,DISBUF ;CHECK NEXT BUFFER
1645 011536 000762 BR CHKDSK
1646 011540 000744 BR PWRFL

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1647
1648
1649      ;ROUTINE TO ABORT DISK DURING POWER FAIL
1650      ;
1651      011542 052777 000400 167244 PWRDN: BIS      @BIT8,@DCS      ;CLEAR THE DISK
1652      011550 012767 011560 166246      MOV      @PWRUP,24      ;SET UP RESTART
1653      011556 000000      HALT
1654
1655      011560 012767 011542 166236 PWRUP: MOV      @PWRDN,24      ;RESET POWER FAIL VECTOR
1656      011566 012706 001000      MOV      @1000,%6
1657      011572 004767 000002      JSR      @7,DELAY
1658      011576 000725      BR      PWRFL      ;GO CHECK DISK
1659
1660      ;
1661      011600 012700 177633      DELAY: MOV      @-145,%0
1662      011604 005002      CLR      @2
1663      011606 000005      18: RESET
1664      011610 005202      INC      @2
1665      011612 001375      BNE      @18
1666      011614 005200      INC      @0
1667      011616 001373      BNE      @18
1668      011620 000207      RTS      @7
1669
1670      ;
1671      ;
1672      ;ROUTINE TO WRITE THE COMPLETE DISK
1673      ;WITH 125252 PATTERN
1674      ;WRITE CHECK AND REPORT ERRORS IF THEY
1675      ;OCCUR
1676      ;REPORT "OK" AT COMPLETION
1677      011622 052777 000400 167164 POWFAL: BIS      @BIT8,@DCS      ;CLEAR THE DISK
1678      011630 011667 167246      MOV      (6),PASSC
1679      011634 012706 001000      MOV      @1000,%6
1680      011640 012767 000020 167206      MOV      @20,PATNU      ;SET UP PATTERN
1681      011646 005067 167200      CLR      DMA
1682      011652 005067 167172      CLR      TRACK
1683      011656 012767 002000 167200      MOV      @2000,SWRDCT      ;SETUP WORD COUNT
1684      011664 016767 167174 167154      MOV      SWRDCT,WRDCT
1685      011672 004567 175722      JSR      @5,PASEL      ;GENERATE DATA BUFFER
1686      011676 012767 014466 167152      MOV      @OUTBUF,BUF      ;SET UP CURRENT ADDRESS
1687      011704 012767 011622 167166      MOV      @POWFAL,WRDCT
1688      011712 104503      WRDWN: WRITE      +100
1689      011714 032777 001000 167056      BIT      @BIT9,@SWR      ;CHECK ON HOW TO WAIT
1690      011722 001002      BNE      +6
1691      011724 000004      IOT      ;BACKGROUND TEST
1692      011726 000404      BR      +12
1693      011730 016777 167104 167044      MOV      PRIORITY,@PS
1694      011736 000001      WAIT
1695      011740 104507      WRCHECK +100
1696      011742 032777 001000 167030      BIT      @BIT9,@SWR      ;
1697      011750 001002      BNE      +6
1698      011752 000004      IOT
1699      011754 000404      BR      +12
1700      011756 016777 167056 167016      MOV      PRIORITY,@PS

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MAINDEC-11-DZRFB-B
DZRFBB.P11

RF11 DATA TEST REPLACES D50A

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1701	011764	000001		WAIT		
1702	011766	004767	175250	JSR	\$7,DISHUF	ISET UP NEW DISK BUFFER
1703	011772	000747		RR	WRDNW	IWRITE NEW BUFFER
1704	011774	104001		ENT	+1	
1705	011776	014055		OK		
1706	012000	000177	167076	JMP	@PASSC	

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1707
1708      ;ROUTINE TO ALLOW THE OPERATOR TO SET BITS
1709      ;IN THE I/O REGISTERS VIA THE SWITCH REGISTER
1710      ;
1711      ;WORD COUNT REGISTER
1712      012004 017777 166770 167004 SELWC: MOV    @SWR,@WC          ;MOV SWR INTO WORD COUNT REG
1713      012012 000774      BR      SELWC
1714      ;
1715      ;CURRENT ADDRESS REGISTER
1716      012014 017777 166760 166776 SELCMA: MOV   @SWR,@CMA       ;MOV SWR INTO CURRENT ADDR REG
1717      012022 000774      BR      SELCMA
1718      ;
1719      ;DISK ADDRESS REGISTER
1720      012024 017777 166750 166770 SELDAR: MOV   @SWR,@DAR       ;MOV SWR INTO DISK ADDR REG
1721      012032 000774      BR      SELDAR
1722      ;
1723      ;DISK ADDRESS EXT AND ERROR REGISTER
1724      012034 017777 166740 166762 SELDAE: MOV   @SWR,@DAE       ;MOV SWR INTO DISK ADDR EXT REG
1725      012042 000774      BR      SELDAE
1726      ;
1727      ;DATA BUFFER REGISTER
1728      012044 017777 166730 166754 SELDBR: MOV   @SWR,@DBR       ;MOV SWR INTO DATA BUFFER
1729      012052 000774      BR      SELDBR
1730      ;
1731      ;
1732      ;LOOK AHEAD REGISTER
1733      012054 017700 166752      MOVLK: MOV    @ADS,@O          ;MOVE LOOK AHEAD
1734      012060 000005      RESET
1735      012062 000005      RESET
1736      012064 000773      BR      MOVLK          ;INTO REGISTER 0
1737      ;
1738      ;
1739      ;DISK CONTROL STATUS REGISTER
1740      012066 012777 000340 166706 SELDCS: MOV    @340,@PS          ;LOCK UP INTERRUPTS
1741      012074 012777 177777 166714      MOV    @177777,@WC       ;SET WORD COUNT =1 WORD
1742      012102 012777 014466 166710      MOV    @OUTRUF,@CMA     ;SET UP CURRENT ADDRESS
1743      012110 017777 166664 166676      MOV    @SWR,@DCS       ;MOV SWR INTO CONTROL REG
1744      012116 032777 000001 166670      BIT    @BIT0,@DCS     ;IS FUNCTION BITS SET
1745      012124 001760      BEQ     SELDCS          ;FUNCTION BITS NOT SET
1746      012126 105777 166662      DKBUSY: TSTB   @DCS          ;TEST FOR DISK NOT READY
1747      012132 100375      BPL     DKBUSY         ;DISK STILL READY
1748      012134 000754      BR      SELDCS         ;DISK NOT BUSY SELECT NEW CR
1749      ;
1750      ;
1751      ;
1752      ;
1753      ;
1754      ;
1755      ;

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1756
1757
1758      ;
1759      ;THIS ROUTINE ENABLES THE OPERATOR TO SELECT A TRACK STATICLY
1760      ;THE ROUTINE DOES A ONE WORD READ TO SELECT THE TRACK
1761      ;THE OPERATOR MAY CHANGE THE SWITCH REGISTER AT ANY TIME
1762      ;SWR6-0 EQUALS THE TRACK NUMBER
1763      ;SWR9-7 EQUALS THE DISK NUMBER
1764      ;
1764      012136 052777 000400 166650 STAMP: BIS      @BIT8,@DCS
1765      012144 017767 166630 166736      MOV      @SWR,WORK1      ;FETCH SWR
1766      012152 016767 166732 166726      MOV      WORK1,WORK
1767      012160 042767 176000 166720      BIC      @176000,WORK      ;MASK THE TRACK AND DISK NO.
1768      012166 006067 166714      ROR      WORK
1769      012172 006067 166710      ROR      WORK
1770      012176 006067 166704      ROR      WORK
1771      012202 006067 166700      ROR      WORK
1772      012206 006067 166674      ROR      WORK
1773      012212 016777 166670 166604      MOV      WORK,@DAE      ;DISK EXT. ADDR. REG. LOADED
1774      012220 017767 166554 166660      MOV      @SWR,WORK
1775      012226 000367 166654      SWAB     WORK
1776      012232 006167 166650      ROL      WORK
1777      012236 006167 166644      ROL      WORK
1778      012242 006167 166640      ROL      WORK
1779      012246 042767 003777 166632      BIC      @3777,WORK
1780      012254 016777 166626 166540      MOV      WORK,@DAR      ;DISK ADDRESS REG LOADED
1781      012262 012777 015070 166530      MOV      @INBUF,@CHA      ;LOAD CURRENT ADDRESS
1782      012270 012777 177777 166520      MOV      @177777,@WC      ;LOAD WORD COUNT
1783      012276 052777 000005 166510      BIS      @5,@DCS      ;GO AND READ
1784      012304 105777 166504      CTDBUSY: TSTB     @DCS      ;TEST FOR CONTROL NOT READY
1785      012310 100375      BPL      CTDBUSY      ;WAIT FOR CONTROL NOT READY
1786      012312 026777 166572 166460 SWRCHG: CNP      WORK1,@SWR
1787      012320 001306      BNE      STAMP      ;SWR HAS CHANGED
1788      012322 000773      BR       SWRCHG      ;SWR HAS NOT CHANGED
1789
1790
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1795
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1799 012324 004567 000404
1800 012330 001106
1801 012332 013750
1802 012334 000006
1803 012336 004567 000372
1804 012342 001066
1805 012344 013536
1806 012346 000003
1807 012350 104000
1808 012352 013534
1809 012354 013536
1810 012356 013750
1811 012360 177777
1812 012362 004767 001016
1813 012366 000167 000056
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1819 012372 004567 000336
1820 012376 001106
1821 012400 013750
1822 012402 000006
1823 012404 004567 000324
1824 012410 001110
1825 012412 013765
1826 012414 000006
1827 012416 004567 000312
1828 012422 001066
1829 012424 013536
1830 012426 000003
1831 012430 104000
1832 012432 013534
1833 012434 013536
1834 012436 013765
1835 012440 013750
1836 012442 177777
1837 012444 004767 000734
1838 012450 032777 002000 166322
1839 012456 001401
1840 012460 000000
1841 012462 000205
1842
1843
1844
1845
1846
1847 012464 011600
1848 012466 022740 104001

;
;ROUTINE TO REPORT ERROR COUNT AND CONTENTS OF ONE REGISTER
;
STAER: JSR      $5,CONV      ;CONVERT OCTAL TO ASCII
        WORK      ;DATA TO BE CONVERTED
        MES10     ;ADDRESS OF MESSAGE
        6
        JSR      $5,CONV      ;CONVERT OCTAL TO ASCII
        ERCOUNT   ;ERROR COUNT TO BE CONVERTED
        HED5      ;ADDRESS OF MESSAGE
        3
        ENT      +0          ;REPORT MESSAGE
        HED5A
        HED5
        MES10
        -1
        JSR      $7,INCTAB    ;INC. ERROR COUNT
        JMP      EREXT        ;EXIT ROUTINE

;
;ROUTINE TO REPORT ERROR COUNT AND THE CONTENTS OF TWO REGISTERS
;
;
;
STAER1: JSR      $5,CONV      ;CONVERT OCTAL TO ASCII
        WORK      ;DATA TO BE CONVERTED
        MES10     ;ADDRESS OF MESSAGE
        6
        JSR      $5,CONV      ;CONVERT OCTAL TO ASCII
        WORK1     ;DATA TO BE CONVERT
        MES10A    ;ADDRESS OF MESSAGE
        6
        JSR      $5,CONV      ;CONVERT OCTAL TO ASCII
        ERCOUNT   ;ERROR COUNT TO BE CONVERTED
        HED5      ;ADDRESS OF MESSAGE
        3
        ENT      +0          ;REPORT MESSAGE
        HED5A
        HED5
        MES10A
        MES10
        -1
        JSR      $7,INCTAB    ;INC. ERROR COUNT
        BIT      @BIT10,@SNR  ;HALT ON ERROR
        BEQ      18
        HALT
        RTS      $5          ;EXIT ROUTINE
181
;
;ROUTINE TO DECODE ENT CALLS
;ENT+1=TYPE ONE LINE OF TEXT
;ENT+0=TYPE A SERIES OF LINES
ENTRP:  MOV      (6),R0
        CMP      @ENT+1,-(0)  ;WAS THE CALL ENT+1

```

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1849 012472 001103
1850 012474 000400

BNE
BR

TYP8
TYP

;NOI TYPE A SERIES OF LINES OF TEXT
;YES TYPE ONE LINE OF TEXT

ms


```

1851
1852      ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
1853      TYP:  MOV    @%6,%0      ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1854      ADD    @2,%%6           ;SET UP EXIT.
1855      MOV    @%0,%0           ;ADDRESS OF MESSAGE TO I/O.
1856      TYP:  MOVB   (0)+,TYPDAT ;GET CHARACTER
1857      CMPB   @100,TYPDAT      ;CHECK FOR "0" CHARACTER
1858      BNE     TYPC            ;BRANCH IF NOT "0".
1859      CLR     TYPDAT          ;OUTPUT NULL
1860      JSP     @7,TYPD         ;TO CLEAR BUFFER
1861      RTI                      ;TERMINATOR CHAR. DONE. EXIT.
1862      TYP:  CMPB   @45,TYPDAT  ;CHECK FOR "%".
1863      BEQ     TYPF            ;BRANCH IF "%".
1864      CMPB   @42,TYPDAT      ;NOT "%". CHECK FOR "0".
1865      BEQ     TYPG            ;BRANCH IF "0"
1866      JSR     @7,TYPD         ;TYPE CHAR IN TYPDAT
1867      BR      TYP:           ;
1868      TYPD:  BIT    @BIT14,%SWR
1869      BNE     TYEXIT          ;
1870      MOVB   TYPDAT,@TPB      ;OUTPUT CHARACTER TO PRINTER
1871      TSTB   @TPB            ;WAIT FOR DONE FLAG.
1872      BPL     ,+4             ;
1873      CMPB   @15,TYPDAT      ;CHECK FOR CR
1874      BNE     IS             ;NO-SKIP
1875      MOV     @9,,NULL        ;SET NULL COUNTER
1876      TST     NULL           ;
1877      BEQ     TYEXIT          ;ZERO-EXIT
1878      DEC     NULL           ;DECREMENT
1879      MOVB   @0,TYPDAT        ;ZERO OUTPUT
1880      BR      TYPD            ;OUTPUT NULL
1881      TYEXIT: RTI              ;EXIT
1882      TYPF:  MOVB   @15,TYPDAT ;MOVE CARRIAGE RETURN CODE TO TYPDAT
1883      JSR     @7,TYPD         ;GO TYPE CHAR.
1884      TYPG:  MOVB   @12,TYPDAT ;MOVE LF CODE TO TYPDAT.
1885      JSR     @7,TYPD         ;GO TYPE CHAR.
1886      BR      TYP:           ;
1887      TYPDAT: 0
1888      NULL:   0
1889      ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
1890      TYP:  MOV    @%6,%0      ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1891      ADD    @2,%%6           ;UPDATE TO NEXT MESSAGE ADDRESS
1892      MOV    @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
1893      CMP    @-1,TYPSB       ;CHECK FOR TERMINATOR
1894      BNE     TYPSA          ;BRANCH IF NOT TERMINATOR.
1895      RTI                      ;TERMINATOR. EXIT
1896      TYPSA:  EMT    +1        ;CALL ON TYP SUB TO TYPE MESSAGE
1897      TYPSB:  0              ;ADDRESS OF MESSAGE GOES HERE
1898      BR      TYP:           ;GO PROCESS NEXT MESSAGE
1899      ;
1900      ;
1901      ;
1902      ;
1903      ;OCTAL TO ASCII CONVERT ROUTINE
1904      ;

```

1905					ENTER ROUTINE AS FOLLOWS	
1906					JSRQ5,CONV	
1907					ADDR=ADDRESS OF NUMBER TO BE CONVERTED	
1908					ADDR BYTE=LSB OF WHERE ASCII IS GOING	
1909					ASCII=THE NUMBER OF ASCII CHAR. TO BE CONVERTED	
1910						
1911						
1912	012734	013567	000054		CONV: MOV 0(5)+,ACNVX	VALUE OF 0 TO BE CONVERTED
1913	012740	012501			MOV (5)+,R1	ASCII ADDR
1914	012742	012502			MOV (5)+,R2	10 OF ASCII CHAR
1915	012744	060201			ADD R2,R1	

1916	012746	016703	000042		ACVN:	MOV	ACHVX,83	
1917	012752	042703	177770			BIC	8177770,83	;ISOLATE LEAST SIGNIFICANT OCTAL8
1918	012756	062703	000060			ADD	860,83	;SET UP ASCII8
1919	012762	110341				MOVB	83,-(1)	;STORE ASCII CHAR
1920	012764	042767	000007	000022		BIC	87,ACHVX	
1921	012772	006067	000016			ROR	ACHVX	;ROTATE OCTAL8
1922	012776	006067	000012			ROR	ACHVX	
1923	013002	006067	000006			ROR	ACHVX	
1924	013006	005302				DEC	82	; -1 FROM ASCII CHAR COUNT
1925	013010	001356				BNE	ACVN	
1926	013012	000205				RTS	85	;EXIT 8 CONVERTED
1927	013014	000000			ACHVX:	0		;WORK REGISTER
1928								
1929								
1930								
1931								
1932								
1933								
1934								
1935	013016	012767	000040	000424	MOCHA:	MOV	840,TSTCH	;SET UP FOR NUM, CHAR.
1936	013024	000403				BR	TYST	
1937	013026	012767	000100	000414	ALPHA:	MOV	8100,TSTCH	;SET UP FOR ALPHA CHAR
1938	013034	012777	000340	165740	TYST:	MOV	8340,8PS	;LOCK UP INTERRUPTS
1939	013042	005067	000400			CLR	TEXBUF	;CLEAR TEXT BUFFER REG
1940	013046	105777	165740		TSTFLG:	TSTB	8TK8	;CHECK FOR FLAG
1941	013052	100375				BPL	TSTFLG	
1942	013054	017777	165726	165722		MOV	8TK8,8TP8	;CHARACTER IN BUFFER
1943	013062	105777	165722			TSTB	8TP8	;ECHO CHARACTER
1944	013066	100375				BPL	.-4	
1945	013070	022777	000377	165710		CMP	8377,8TK8	;CHECK FOR RUB-OUT
1946	013076	001014				BNE	CKCH	;EXIT IF NOT RUB-OUT
1947	013100	104001				ENT	+1	
1948	013102	013746				MES8		;REPORT RUB-OUT ACKNOWLEDGED
1949	013104	042767	000007	000334		BIC	87,TEXBUF	
1950	013112	006067	000330			ROR	TEXBUF	
1951	013116	006067	000324			ROR	TEXBUF	
1952	013122	006067	000320			ROR	TEXBUF	
1953	013126	000747				BR	TSTFLG	;GO WAIT FOR NEW CHAR.
1954	013130	022777	000215	165650	CKCH:	CMP	8215,8TK8	;CHECK FOR CARRIAGE RETURN
1955	013136	001001				BNE	.-4	
1956	013140	000207				RTS	87	;EXIT DELIMITER TYPED
1957	013142	036777	000302	165636		BIT	TSTCH,8TK8	
1958	013150	001003				BNE	CHOK	
1959	013152	104001				ENT	+1	;REPORT QUESTION MARK
1960	013154	013744				MES7		
1961	013156	000733				BR	TSTFLG	;WAIT FOR CORRECT CHAR.
1962	013160	017767	165622	165720	CHOK:	MOV	8TK8,WORK	
1963	013166	042767	177770	165712		BIC	8177770,WORK	
1964	013174	000241				CLC		
1965	013176	006167	000244			ROL	TEXBUF	
1966	013202	000241				CLC		
1967	013204	006167	000236			ROL	TEXBUF	
1968	013210	000241				CLC		
1969	013212	006167	000230			ROL	TEXBUF	

1970	013216	066767	165664	000222		ADD	WORK,TEXBUF	;ADD CHARACTER
1971	013224	000710				BR	TSTFLG	;WAIT FOR NEW CHARACTER
1972						;ROUTINE TO SET ACTION ANABLE ON MA/MF PARITY MEMORIES		
1973						;CALL JSR PC, MAMF		
1974		172100					PARCSR = 172100	
1975		000114					PARVEC = 114	
1976		000004					ERRVEC = 4	
1977		000006					SP = %6	
1978								
1979	013226	012737	013320	000114	MAMF:	MOV	%PARSRV,%PARVEC	;SET PARITY INTERRUPT VECTOR
1980	013234	012737	000340	000116		MOV	%340,%PARVEC+2	;AND PRIORITY LEVEL 1 ON INTERRUPT
1981	013242	013746	000004			MOV	%ERRVEC,-(SP)	;SAVE CURRENT ERROR VECTOR
1982	013246	013746	000006			MOV	%ERRVEC+2,-(SP)	;AND PRIORITY LEVEL
1983	013252	012737	000006	000004		MOV	%ERRVEC+2,%ERRVEC	
1984	013260	012737	000002	000006		MOV	%RTI,%ERRVEC+2	
1985	013266	012700	172100			MOV	%PARCSR,%0	;GET FIRST CSR ADDRESS
1986	013272	012702	000001			MOV	%1,%2	
1987	013276	012720	000001		18:	MOV	%1,(0)+	;SET ACTION ENABLE IF AVAILABLE
1988	013302	006302				ASL	%2	;SHIFT AVAILABILITY INDICATOR
1989	013304	103374				BCC	%1	
1990	013306	012637	000006			MOV	(SP)+,%ERRVEC+2	;RESTORE ERROR VECTOR
1991	013312	012637	000004			MOV	(SP)+,%ERRVEC	;PRIORITY LEVEL AND INTERRUPT VECTOR
1992	013316	000207				RTS	%7	
1993						;PARITY ERROR SERVICE ROUTINE		
1994						;WHEN A PARITY ERROR IS DETECTED THE ROUTINE SCANS		
1995						;MEMORY FOR THE PARITY ERROR. WHEN THE ERROR		
1996						;IS DETECTED THE PROGRAM HALTS WITH THE ADDRESS		
1997						;CAUSING THE ERROR IN R0		
1998						;TO CONTINUE PRESS CONTINUE		
1999								
2000								
2001	013320	104001				PARSRV:	ENT+1	
2002	013322	014354					PARERR	
2003	013324	012737	013352	000114		MOV	%28,%PARVEC	;REPOSITION PARITY ERROR INT.
2004	013332	012737	013400	000004		MOV	%48,%ERRVEC	;SET TIME OUT TRAP
2005	013340	005037	000006			CLR	%ERRVEC+2	
2006	013344	005000				CLR	%0	
2007	013346	005720			18:	TST	(0)+	;SCAN MEMORY
2008	013350	000776				BR	%1	
2009	013352	000000			28:	HALT		;PARITY ERROR - ADDRESS
2010								;CAUSING ERROR IS IN REGISTER 0
2011	013354	000005			38:	RESET		
2012	013356	012737	013320	000114		MOV	%PARSRV,%PARVEC	;RESTORE PARITY VECTOR
2013	013364	012737	000006	000004		MOV	%ERRVEC+2,%ERRVEC	;RESTORE TIME OUT HALT
2014	013372	004767	177630			JSR	%7,MAMF	
2015	013376	000002				RTI		
2016	013400	000000			48:	HALT		;ERROR - PARITY ERROR NOT DETECTED ON SCAN
2017	013402	000764				BR	%38	;4(SP) CONTAINS PC WHERE
2018								;PARITY ERROR WAS ORIGINALLY DETECTED
2019	013404	016703	165432		INCTAB:	MOV	FLAG,%3	
2020	013410	042703	177743			BIC	%177743,%3	;MASK DEVICE NO
2021	013414	000241				CLC		
2022	013416	006003				ROR	%3	;NORMALIZE
2023	013420	005263	013426			INC	TABLE(3)	;INCREMENT ERROR COUNT

2024	013424	000207
2025	013426	000000
2026	013430	000000
2027	013432	000000
2028	013434	000000
2029	013436	000000
2030	013440	000000
2031	013442	000000
2032	013444	000000

	RTS
TABLE:	0
	0
	0
	0
	0
	0
	0
	0
	0

ERROR COUNT DRIVE 0
ERROR COUNT DRIVE 1
ERROR COUNT DRIVE 2
ERROR COUNT DRIVE 3
ERROR COUNT DRIVE 4
ERROR COUNT DRIVE 5
ERROR COUNT DRIVE 6
ERROR COUNT DRIVE 7

2033	013446	000000			TEXBUF: 0
2034	013450	000000			TSTCH: 0
2035					;
2036					;
2037					;
2038					;
2039					;
2040					;ERROR MESSAGE HEADERS
2041					;
2042					
2043					;EVEN
2044	013452	042045	052101	020101	HED1: ;ASCII /DATA ERR 0/
2045	013460	051105	020122	100	
2046					;
2047					;
2048	013465	045	052123	052101	HED2: ;ASCII /STATUS ERR 0/
2049	013472	051525	042440	051122	
2050	013500	040040			
2051					;
2052					;
2053	013502	042445	052130	040522	HED3: ;ASCII /EXTRA BKS 0/
2054	013510	041040	051513	040040	
2055					;
2056	013516	042045	020113	042101	HED4: ;ASCII /BCK ADDR ERR 0/
2057	013524	051104	042440	051122	
2058	013532	040040			
2059					;
2060					;
2061	013534	040045			HED5A: ;ASCII /00/
2062					;
2063					;
2064	013536	020040	020040	051105	HED5: ;ASCII / ERR CNT 0/
2065	013544	020122	047103	020124	
2066	013552	100			
2067					;
2068					;
2069	013553	045	040522	042516	HED6: ;ASCII /GRANEX ERR 0/
2070	013560	020130	051105	020122	
2071	013566	100			
2072					;
2073					;
2074					;MESSAGE TRAILERS
2075					;
2076					;
2077	013567	040	020040	020040	HED7: ;ASCII / DAR 0/
2078	013574	020040	040504	020122	
2079	013602	100			
2080					;
2081					;
2082					;
2083	013603	040	020040	040504	HED8A: ;ASCII / DAE 0/
2084	013610	020105	100		
2085					;
2086					;

2087					I		
2088	013613	040	020040	020040	MES2:	.ASCII /	DCS 0/
2089	013620	020040	041504	020123			
2090	013626	100					
2091					I		
2092	013627	040	020040	020040	MES2A:	.ASCII /	HRD ERR0/
2093	013634	020040	051110	020104			
2094	013642	051105	040122				
2095					I		
2096					I		
2097	013646	020040	020040	053440	MES3:	.ASCII /	WRD CNT0/
2098	013654	042122	041440	052116			
2099	013662	100					
2100					I		
2101					I		
2102					I		
2103	013663	040	020040	020040	MES4:	.ASCII /	WRD ADDR,0/
2104	013670	020040	051127	020104			
2105	013676	042101	051104	040056			
2106					I		
2107					I		
2108					I		
2109	013704	020040	020040	020040	MES5:	.ASCII /	GD DATA 0/
2110	013712	043440	020104	040504			
2111	013720	040524	040040				
2112					I		
2113					I		
2114					I		

2115							
2116	013724	020040	020040	020040	MES6:	.ASCII /	BD DATA 0/
2117	013732	041040	020104	040504			
2118	013740	040524	040040				
2119							
2120							
2121							
2122	013744	040077			MES7:	.ASCII /70/	
2123							
2124							
2125							
2126							
2127	013746	040057			MES8:	.ASCII '/0'	
2128							
2129							
2130	013750	020040	020040	020040	MES10:	.ASCII /	WRD1 0/
2131	013756	053440	042122	020061			
2132	013764	100					
2133							
2134							
2135	013765	040	020040	020040	MES10A:	.ASCII /	WRD2 0/
2136	013772	020040	051127	031104			
2137	014000	040040					
2138							
2139	014002	052445	044516	020124	MES11:	.ASCII /SUNIT NO.0/	
2140	014010	047516	040056				
2141							
2142							
2143	014014	020040	100		MES12:	.ASCII / 0/	
2144							
2145							
2146	014017	040	051040	040505	MES13:	.ASCII / READ 0/	
2147	014024	020104	100				
2148							
2149							
2150	014027	045	050103	020125	TIMO:	.ASCII /CPU BKGRND TIMED OUT0/	
2151	014034	045502	051107	042116			
2152	014042	052040	046511	042105			
2153	014050	047440	052125	100			
2154							
2155							
2156	014055	045	045517	040041	OK:	.ASCII /OK!0/	
2157							
2158							
2159							
2160							
2161	014062	042045	052101	020101	CON1:	.ASCII /SDATA TEST ONLY? 0/	
2162	014070	042524	052123	047440			
2163	014076	046116	037531	040040			
2164							
2165							
2166							
2167	014104	046445	046125	044524	CON2:	.ASCII /MULTI DK MODE?0/	
2168	014112	042040	020113	047515			

2169	014120	042504	040077		
2170					
2171					
2172	014124	021445	047440	020106	CON3: ,ASCII /% OF DKS 1 TO 10 OCTAL?/
2173	014132	045504	020123	020061	
2174	014140	047524	030440	020060	
2175	014146	041517	040524	037514	
2176	014154	100			
2177					
2178					
2179	014155	045	054105	020056	CON4: ,ASCII /%FX, DK?/
2180	014162	045504	040077		
2181					
2182					
2183	014166	047445	052120	053440	CON5: ,ASCII /%OPT WRD CNT? %/
2184	014174	042122	041440	052116	
2185	014202	020077	100		
2186					
2187					
2188	014205	045	042514	043516	CON6: ,ASCII /%LENGTH (1 TO 1000)?/
2189	014212	044124	024040	020061	
2190	014220	047524	030440	030060	
2191	014226	024460	040077		
2192					
2193					
2194	014232	053445	042122	040440	CON7: ,ASCII /%WRD ADDR?/
2195	014240	042104	037522	100	
2196					
2197					
2198	014245	045	050117	027124	CON8: ,ASCII /%OPT. DATA PAT. %?/
2199	014252	042040	052101	020101	
2200	014260	040520	027124	021440	
2201	014266	040077			
2202					
2203					
2204	014270	053445	044522	042524	CON9: ,ASCII /%WRITE?/
2205	014276	040077			
2206					
2207					
2208	014300	053445	044522	042524	CON10: ,ASCII /%WRITE CHECK?/
2209	014306	041440	042510	045503	
2210	014314	040077			
2211					
2212					
2213	014316	051045	040505	037504	CON11: ,ASCII /%READ?/
2214	014324	100			
2215					
2216					
2217	014325	045	047520	042527	PHRF: ,ASCII /%POWER HAS FAILED?/
2218	014332	020122	040510	020123	
2219	014340	040506	046111	042105	
2220	014346	100			
2221					
2222					

2223	014347	045	047105	040104	ENDI	.ASCII	/SEND0/
2224	014354	046445	046505	051117	PARERR:	.ASCII	/MEMORY PARITY ERROR0/
2225	014362	020131	040520	044522			
2226	014370	054524	042440	051122			
2227	014376	051117	100				
2228	014401	040	020040	100	PATNES:	.ASCII	/ 0/
2229	014405	045	040520	052124	PATHED:	.ASCII	/SPATTERN 0/
2230	014412	051105	020116	100			
2231	014417	045	051104	053111	MODRVI	.ASCII	/SDRIVE ZERO OFF LINE0/
2232	014424	020105	042532	047522			
2233	014432	047440	043106	046040			
2234	014440	047111	040105				
2235	014444	042045	044522	042526	RKNUM:	.ASCII	/SDRIVE(S) ON LINE0/
2236	014452	051450	020051	047117			
2237	014460	046040	047111	040105			
2238							
2239						.EVEN	

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2240			
2241	014466	000000	OUTBUF: 0
2242		015070	.S.+400
2243	015070	000000	INBUF: 0
2244			!
2245			!
2246			!
2247			!
2248		000001	.END

ACNVX	013014	340*	341*	342*	343*	345	441*	443	1250*	1251*	1253	1451*	1452*	1454
		1457*	1458*	1459*	1461	1912*	1916	1920*	1921*	1922*	1923*	1927*		
ACVN	012746	1916*	1925											
ADAM	010174	1357	1361*											
ADRCMP	003260	531	537*											
ADRD	005462	893	895*											
ADS	001032	162*	661	1733										
ADTST	002056	247	336*	1024										
ADT2	002150	55	366*	479										
ADT3	003014	61	495*	555										
ADT4	003370	65	572*	646										
ADT5	004016	68	654*	691										
AKH	007470	1204	1207	1212*										
ALPHA	013026	251	257	282	315	321	327	1937*						
ASKWC	001554	270	280*											
BIT0	= 000001	10*	1127	1507	1744									
BIT1	= 000002	11*												
BIT10	= 002000	20*	254	350	1115	1124	1235	1406	1838					
BIT11	= 004000	21*	221	245	260	336	477	554	644	690	750	835	900	1000
BIT12	= 010000	22*	330	877	892									
BIT13	= 020000	23*	324	866	1131									
BIT14	= 040000	24*	318	856	1100	1868								
BIT15	= 100000	25*	308	591	593	596	633	635	641					
BIT2	= 000004	12*												
BIT3	= 000010	13*												
BIT4	= 000020	14*	1527											
BIT5	= 000040	15*												
BIT6	= 000100	16*	1184	1215	1232									
BIT7	= 000200	17*	165	1146										
BIT8	= 000400	18*	376	402	427	508	526	576	610	660	690	773	900	939
		1113	1481	1562	1580	1601	1651	1677	1764					
BIT9	= 001000	19*	860	871	886	920	941	948	957	965	967	1061	1121	1134
		1364	1450	1569	1585	1638	1689	1696						
BUF	001056	181*	368*	399*	429*	459*	500*	577*	611*	659*	705*	729*	779*	794*
		858*	868*	879*	938*	954*	1036	1686*						
CHKBUP	002650	435	454*											
CHKDAT	011336	1584*	1592											
CHKDOS	006224	1002*	1012											
CHKDSK	011504	1637*	1645											
CHKFLG	002046	329	331*											
CHOK	013160	195*	1962*											
CHWRD	010520	1445*	1449	1469										
CKCH	013130	1946	1954*											
CKNEX	010530	1446	1448*											
CLEAR	010462	1427	1429*											
CLRREG	005160	837*												
CLRTAB	001126	204*	207											
CNA	001020	157*	1716*	1742*	1781*									
CNDAE	007274	1183	1186*											
CNNETK	003714	624	631*											
CMPDTK	003656	617	623*											
CMPNEX	003266	539*	549											
CMPX1	004532	741	749*											
CONDAR	007256	1180	1182*											

COMPAR	010112	894	963	1350*										
CONN	001372	218	249*											
CONV	012734	233	344	442	968	972	976	1064	1076	1085	1094	1105	1218	1222
		1252	1374	1378	1383	1388	1394	1453	1460	1799	1803	1819	1823	1827
		1912*												
CON1	014062	250	2161*											
CON10	014300	320	2208*											
CON11	014316	326	2213*											
CON2	014104	256	2167*											
CON3	014124	262	2172*											
CON4	014155	272	2179*											
CON5	014166	281	2183*											
CON6	014205	286	2188*											
CON7	014232	295	2194*											
CON8	014245	302	2198*											
CON9	014270	314	2204*											
CTBUSY	012304	1784*	1785											
DAE	001024	159*	226*	246*	1062	1102	1186	1212	1724*	1773*				
DAR	001022	158*	384	441	468	1083	1182	1205	1209	1214	1720*	1780*		
DATAT	005170	352	848*	901	909									
DATTES	001514	259	271*	275										
DBR	001026	160*	1030	1728*										
DCS	001014	155*	221	376*	378	380	383	402*	404	406	408	427*	432	434
		436	462	464	467	508*	510	512	514	526*	528	530	533	576*
		580	582	585	610*	614	616	619	660*	662	667	670	698*	707
		709	712	718	720	723	731	733	736	773*	783	785	787	796
		798	801	816	818	821	939*	1058	1070	1093	1100	1113*	1127*	1481*
		1562*	1580*	1601*	1631*	1677*	1743*	1744	1746	1764*	1783*	1784		
DELAY	011600	1609	1637	1661*										
DELNES	006576	1073	1083*											
DISBUF	007242	902	1179*	1575	1591	1644	1702							
DISK	006344	42	1030*											
DKBUSY	012126	1746*	1747											
DKINT	006436	47	1055*											
DMA	001052	179*	212*	299*	372*	390	392*	401*	430*	437*	495*	520*	524*	552*
		572*	594*	598*	607*	637*	642*	654*	674	686	688*	703*	716*	728*
		781*	793*	814*	837*	929*	930*	932*	969	998*	1035	1170*	1171*	1179*
		1182	1196*	1214*	1219	1233*	1366	1563*	1581*	1632*	1681*			
DOWN	011376	37	1566	1601*	1605									
DRVERQ	006300	1010	1013*											
DSKDR	001446	261*	266											
DSKNOR	001076	189*	241*	242*	243*	244*	267*	268*	269*	1004				
DSKRD	005402	882*	899											
ELH	005446	889	892*											
ENTRP	012464	40	1847*											
END	014347	1016	2223*											
ERADR	007524	1193	1218*											
ERCOUN	001066	185*	382*	410*	439*	466*	515*	532*	542*	584*	618*	627*	669*	681*
		711*	722*	735*	742*	751*	788*	800*	807*	820*	828*	1804	1828	
EREXT	012450	1813	1838*											
ERRVEC	000004	1976*	1981	1982	1983*	1984*	1990*	1991*	2004*	2005*	2013*			
ER1	002276	386*												
ER10	003312	543*												
ER11	003464	586*												

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CROSS REFERENCE TABLE

ER12	003650	620*												
ER13	003710	628*												
ER14	004124	671*												
ER15	004176	682*												
ER16	004340	713*												
ER17	004404	724*												
ER20	004464	737*												
ER21	004524	745*												
ER22	004564	754*												
ER23	004716	789*												
ER24	004776	802*												
ER25	005036	810*												
ER26	005102	822*												
ER27	005142	831*												
ER3	002432	411*												
ER4	002616	440*												
ER5	002752	469*												
ER6	003144	516*												
ER7	003252	534*												
ESH	005356	867	874	877*										
EXGEN	010042	1302	1307*											
EXMFLG	002134	337	350*											
EXRAX	006162	566	986*											
EXREF	010714	1491*	1495											
EXTCME	007410	1195	1202*											
EXTDR	007522	1201	1217*											
EXTHEM	010634	51	850	1481*										
EXTPP	006340	906	1014	1019	1024*									
FILDAT	007700	1265*	1268											
FLAG	001042	175*	210*	219*	245*	254*	260*	279*	308*	312*	318*	324*	330*	331
		336	340	350	856	866	877	880*	884*	896	904	920*	965	967*
		1000	1002	1011*	1013*	1017*	1032	1061*	1074	1184*	1188	1194	1198*	1208*
		1215	1232*	1364*	1371	1392	1450*	2019						
		1487	1497	1502*										
GOTHEM	010756	1399	2044*											
HED1	013452	1069	2048*											
HED2	013465	1465	2053*											
HED3	013502	1227	2056*											
HED4	013516	1805	1809	1829	1833	2064*								
HED5	013536	230	1110	1808	1832	2061*								
HED5A	013534	981	2069*											
HED6	013553	1278	1288	1303*	1309*									
HINUM	010046	1908	852*	921*	1118	1565*	1583*	1634*	1687*					
HRDER	001100	503*	506	522										
INADB	003060	611	623	626	729	740	743	749	753	794	805	809	826	830
INBUF	015070	1781	2243*											
		575	679	686*										
INCADS	004204	540	546*											
INCCMP	003316	1060	1231	1365	1812	1837	2019*							
INCTAB	013404	465	473*											
INDADT	002760	192*	879	954	1352	1422	1441	1444	1511*	1512*				
INPUT	001104	590	607*											
INSRD	003560	579*	588	595	599	601								
INSWT	003432	1059	1120	1131*										
INTEXT	007024													

LDAT	005234	852	855	903															
LGMEM	010740	1484	1496																
LOGICA	006330	1020																	
LONUM	010044	1277	1286	1290	1300														
LPADT3	003360	551	554																
LPADT5	004132	668	674																
LPSP11	004572	750	758																
LPTSK	004002	632	644																
LPXSP1	005150	827	835																
LP2ADT	003000	474	477																
MA	001030	1618																	
MAHF	013226	216	1979	2014															
MAXREF	010750	1488	1493	1501															
MES1	013567	970	983	1087	1091	1220	1229	1376	1402	2077									
MES1A	013603	974	982	1066	1090	1224	1228	1380	1401	2083									
MES10	013750	1801	1810	1821	1835	2130													
MES10A	013765	1825	1834	2135															
MES11	014002	339	2139																
MES12	014014	346	349	2143															
MES13	014017	1078	1081	1396	1400	2146													
MES2	013613	1096	1099	2088															
MES2A	013627	1107	1111	2092															
MES3	013646	978	984	2097															
MES4	013663	444	447	1455	1466	2103													
MES5	013704	1385	1403	2109															
MES6	013724	1390	1404	1462	1467	2116													
MES7	013744	1960	2122																
MES8	013746	1948	2127																
MOVLK	012054	114	1733	1736															
MSTR	005530	904																	
MYNEM	003530	592	596																
MYBYWR	011254	1568	1576																
NOCHA	013016	263	273	287	296	303	1935												
NODRV	014417	231	2231																
NULL	012700	1875	1876	1878	1888														
NZUF	010452	1426	1430																
OK	014055	1705	2156																
OPDAR	001636	284	294	298															
OPDSEL	007054	855	1146																
OPPAT	001664	3018	305																
OPRD	002020	323	325																
OPWCK	001772	317	319																
OPWRT	001744	307	313	332															
OUTBUF	014466	368	422	426	429	500	502	505	537	548	574	577	589	591					
		593	596	597	659	704	705	776	777	779	858	868	924	926					
		928	929	932	933	934	936	938	1262	1351	1486	1505	1511	1686					
		1742	2241																
		895	964	1439															
OVRFLO	010466																		
PARCSR	172100	1974	1985																
PARERR	014354	2002	2224																
PARSRV	013320	1979	2001	2012															
PARVEC	000114	1975	1979	1980	2003	2012													
PASEL	007620	373	854	1250	1685														
PASS	001074	188	1520	1534															

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CROSS REFERENCE TABLE

PASSC	001102	1910	910*	986*	1678*	1706								
PATHED	014405	1257	2229*											
PATHES	014401	1254	1258	2228*										
PATNU	001054	1800	213*	309*	311*	369	370*	374*	907*	908	910*	1250	1260	1680*
PATO	010050	1265	1322*											
PAT1	010052	1323*												
PAT10	010070	1330*												
PAT11	010072	1331*												
PAT12	010074	1332*												
PAT13	010076	1333*												
PAT14	010100	1334*												
PAT15	010102	1335*												
PAT16	010104	1336*												
PAT17	010106	1337*												
PAT2	010054	1324*												
PAT20	010110	1338*												
PAT3	010056	1325*												
PAT4	010060	1326*												
PAT5	010062	1327*												
PAT6	010064	1328*												
PAT7	010066	1329*												
PFT1	011204	85	1560*											
PFT2	011442	88	1630*											
PFWAT	011214	1562*	1565	1577	1593									
POWFAL	011622	1561	1631	1677*	1687									
PRIORI	001040	1650	864	875	890	922	945	952	961	1573	1589	1642	1693	1700
PS	001002	1470	209*	699*	774*	849*	853*	864*	869*	875*	882*	890*	922*	945*
		952*	961*	1573*	1589*	1642*	1693*	1700*	1740*	1938*				
PWRDN	011542	1635	1651*	1655										
PWRF	014325	1608	2217*											
PWRFL	011452	1632*	1634	1646	1658									
PWRUP	011560	1652	1655*											
RANDOM	007720	925	937	1264	1277*	1306								
RANER	006072	921	965*											
RANEX	005564	77	918*	990										
RANNU	001044	176*												
RCNODV	001272	222	224	228*										
RDMORE	002304	381	390*											
RDTDN	003212	526*	536	553										
RDTKS	003616	613*	622	638	640	643								
RDWAIT	005436	887	890*											
READ	0104405	310	527	613	730	795	815	885	956					
REH	005512	878	900*											
REPDRV	001306	229	233*											
REPOEM	006310	1001	1005	1015*										
RFADT	002224	376*	389	393										
RFRD	002330	391	395*	476										
RKNUM	014444	235	239	2235*										
RTIX	011202	1518	1523*	1545*										
SAVE	001070	186*	369*	374	395*	420	423	430	454*	456*	507*	519	537*	539
		541	546*	548	609*	623	625	631	633	635*	636*	641*	656*	1351*
		1353	1358*	1382	1482*	1485*	1486	1490*	1491	1492	1494*	1496*	1501*	1505*
		1506*	1507*	1508	1512									
SAV1	001072	1870	394*	401	409	415	417	437	457	473	475*	1352*	1353	1359*

		1387												
SELCMA	012014	98	1716*	1717										
SELDAB	012034	106	1724*	1725										
SELDAR	012024	102	1720*	1721										
SELDBR	012044	110	1728*	1729										
SELDCS	012066	118	1740*	1745	1748									
SELWC	012004	94	1712*	1713										
SHIFT	007736	1281*	1285											
SLH	005304	857	863	866*										
SOFTER	006760	1101	1119*											
SP	0000006	1977*	1981*	1982*	1990	1991								
SPECOR	001234	221*	227											
SPIL1	004346	710	716*											
SPIL2	004412	721	727*											
SPIL3	004472	734	740*											
SPIRAL	004232	71	698*	715	726	739	748	757	759					
STAER	012324	516	534	586	620	671	713	724	737	789	802	822	1799*	
STAER1	012372	386	411	440	469	543	628	682	745	754	810	831	1819*	
STAMP	012136	122	1764*	1787										
START	001116	46	202*											
STATUS	001036	164*												
SUADR	002440	407	415*	455										
SWR	001000	146*	217	477	554	644	690	758	835	860	871	886	892	900
		941	948	957	988	1115	1121	1124	1131	1134	1146	1149	1157	1235
		1406	1569	1585	1638	1689	1696	1712	1716	1720	1724	1728	1743	1765
		1774	1786	1838	1868									
SWRCHG	012312	1786*	1788											
SWRDCT	001064	1848	214*	215	292*	293	851	1200	1423	1442	1508*	1509*	1510	1683*
		1884												
TABLE	013426	204	1009	2023*	2025*									
TDMA	001062	1838												
TEXBUF	013446	220*	223	225*	228	234	241	252	258	264*	265	267	274	277*
		278*	279	283	288	290	292	297	299	304	306	309	316	322
		328	1939*	1949*	1950*	1951*	1952*	1965*	1967*	1969*	1970*	2033*		
TFBL	003152	513	519*											
TIMO	014027	1542	2150*											
TKB	001006	1498	1942	1945	1954	1957	1962							
TKS	001012	1518	1940											
TPR	001004	1488	1870*	1942*										
TPS	001010	1508	1871	1943										
TRACK	001050	1788	211*	371*	496*	573*	600*	608*	639*	655*	702*	780*	838*	934*
		973	999*	1031	1156*	1181*	1190	1197*	1212*	1213*	1234*	1367	1564*	1582*
		1633*	1682*											
TSTCH	013450	1935*	1937*	1957	2034*									
TSTFLG	013046	1940*	1941	1953	1961	1971								
TSTTK	003472	583	589*											
TWRDCT	001060	1828												
TYEXIT	012646	1869	1877	1881*										
TYP	012476	1850	1853*											
TYPA	012506	1856*	1867	1886										
TYPC	012534	1858	1862*											
TYPD	012562	1860	1866	1868*	1880	1883	1885							
TYPDAT	012676	1856*	1857	1859*	1862	1864	1870	1873	1879*	1882*	1884*	1887*		
TYPF	012650	1863	1882*											

TYPG	012662	1865	1884*											
TYP5	012702	1849	1890*	1898										
TYPSA	012726	1894	1896*											
TYPSB	012730	1892*	1893	1897*										
TYST	013034	1936	1938*											
UP	011414	1602	1605*											
UPCHK	011312	1580*	1583	1610										
VECTOR	001034	163*												
WC	001016	156*	1119	1712*	1741*	1782*								
WCCON	001574	285*	289	291										
MCWAIT	005346	872	875*											
WDERR	010176	1354	1364*											
WONWD	002334	398*	399	414										
WORK	001106	197*	203*	206*	384*	385*	409*	415*	416*	420	437*	438*	468*	497*
		503	504*	507	514*	519*	521	523*	533*	541*	585*	619*	626*	664*
		670*	675	677*	678	680*	712*	723*	736*	743*	753*	787*	801*	809*
		821*	830*	896*	897*	898	923*	935*	1002*	1003*	1004	1006	1032*	1033*
		1034	1041*	1042*	1043	1062*	1063*	1065	1070*	1071*	1072	1074*	1075*	1077
		1083*	1084*	1086	1093*	1095	1102*	1103*	1104*	1106	1149*	1150*	1151*	1152*
		1153*	1154*	1155*	1156	1157*	1158*	1159*	1160*	1161*	1162*	1163*	1164*	1165*
		1166*	1167*	1168*	1169*	1171	1188*	1189*	1190*	1191*	1192	1205*	1206*	1261*
		1266*	1267	1301*	1305*	1366*	1368*	1375	1382*	1384	1387*	1389	1392*	1393*
		1395	1766*	1767*	1768*	1769*	1770*	1771*	1772*	1773	1774*	1775*	1776*	1777*
		1778*	1779*	1780	1800	1820	1962*	1963*	1970					
WORK1	001110	198*	383*	408*	436*	467*	498*	525*	539	547*	550	625*	674*	675
		678	744*	752*	808*	829*	1186*	1187*	1192	1202*	1203	1223	1367*	1370*
		1373*	1379	1765*	1766	1786	1824							
WORK2	001112	199*	1350*	1355*	1356	1368								
WORK3	001114	200*	1371*	1372*	1373	1423*	1424*	1425*	1426	1442*	1443*	1444*	1445	
WRABF	003104	508*	518											
WRADTS	004052	660*	673	685	689									
WRCADT	002522	425	427*	451										
WRCHEC	= 104407	30*	431	870	947	1584	1637	1695						
WRDCMP	010132	1353*	1360											
WRDCT	001046	177*	215*	293*	367*	400*	428*	460*	501*	578*	612*	658*	701*	727*
		778*	792*	851*	928*	930	935	977	1037	1179	1200*	1206	1209*	1210*
		1211*	1261	1356	1439	1510*	1684*							
WRDINC	010142	1355*	1409											
WRDNW	011712	1688*	1703											
WRITE	= 104403	29*	377	403	461	509	579	663	706	717	782	859	940	1568
		168*												
WRLG	005620	923*	927	931	987									
WRWAIT	005274	861	864*											
XINCW	011142	1531*	1532	1533	1536									
XLPA DT	004222	687	690*											
XSPIRA	004602	74	773*	791	804	813	824	834	836					
XWAIT	011052	35	1518*											
X1SPIL	004724	786	792*											
X2SPIL	005004	799	805*											
X3SPIL	005044	806	814*											
X4SPIL	005110	819	826*											
ZBUF	010430	883	955	1422*										
ZEROAD	002660	424	456*	472										
ZRBIT	003764	634	641*											

.	= 015072	338	348	398	458	518	548	1418	253	351	379	405	433	459
		463	478	511	529	581	615	645	708	719	732	784	797	817
		905	942	944	949	951	958	960	989	1116	1122	1125	1132	1135
		1147	1216	1236	1369	1407	1528	1535	1570	1572	1586	1588	1639	1641
		1690	1692	1697	1699	1872	1944	1955	22428					

ADC	1287	1289	1291	1292	1294	1297									
ADD	225	226	392	454	520	546	552	594	598	637	642	907	930	1011	1013
	1171	1179	1190	1199	1206	1286	1288	1290	1293	1295	1296	1358	1359	1368	1425
	1441	1444	1494	1512	1854	1891	1915	1918	1970						
ASL	1281	1988													
BCC	599	638	1180	1207	1369	1989									
BCS	931														
BEQ	224	289	307	332	337	351	391	421	424	474	478	540	551	590	624
	632	634	645	676	679	687	741	750	806	827	857	867	878	927	966
	989	1001	1005	1019	1101	1116	1120	1122	1125	1132	1183	1236	1264	1302	1357
	1407	1449	1483	1493	1535	1745	1839	1863	1865	1877					
BHI	1010														
BIC	312	343	416	419	596	635	880	897	920	926	933	967	1003	1017	1033
	1042	1063	1071	1075	1104	1155	1169	1170	1187	1189	1191	1198	1202	1213	1232
	1372	1393	1507	1767	1779	1917	1920	1949	1963	2020					
BIS	219	245	254	260	279	308	318	324	330	376	402	427	508	526	576
	593	610	641	660	698	773	939	1034	1061	1113	1127	1184	1208	1364	1373
	1450	1481	1562	1580	1601	1651	1677	1764	1783						
BIT	221	331	336	350	477	554	591	633	644	690	758	835	856	860	866
	871	877	886	892	900	941	948	957	965	988	1000	1100	1115	1121	1124
	1131	1134	1146	1215	1235	1406	1569	1585	1638	1689	1696	1744	1838	1868	1957
BLOS	266	275	291	298	305										
BMI	218	1484	1487												
BNE	207	222	229	253	259	284	317	323	329	506	522	549	555	592	691
	759	836	861	872	887	893	899	901	909	942	949	958	987	1073	1135
	1147	1193	1204	1216	1268	1285	1306	1354	1427	1446	1570	1586	1639	1665	1667
	1690	1697	1787	1849	1858	1869	1874	1894	1925	1946	1955	1958			
BPL	379	381	405	407	433	435	463	465	511	513	529	531	581	583	615
	617	666	668	708	710	719	721	732	734	784	786	797	799	817	819
	905	1059	1195	1533	1747	1785	1872	1941	1944						
BR	227	270	389	393	414	425	451	455	472	518	536	553	588	595	601
	622	640	643	673	685	689	715	726	739	748	757	791	804	813	824
	834	863	874	889	903	944	951	960	1012	1014	1201	1360	1409	1430	1469
	1495	1497	1524	1536	1572	1576	1577	1588	1592	1641	1645	1646	1658	1692	1699
	1703	1713	1717	1721	1725	1729	1736	1748	1788	1850	1867	1880	1886	1898	1936
	1953	1961	1971	2008	2017										
CLC	276	310	1007	1964	1966	1968	2021								
CLR	205	210	211	212	213	220	246	370	371	372	394	395	422	456	458
	495	496	497	498	523	524	525	572	573	574	607	608	609	654	655
	656	702	780	837	838	910	998	999	1055	1196	1197	1233	1234	1280	1350
	1429	1503	1519	1530	1538	1563	1564	1581	1582	1632	1633	1662	1681	1682	1859
	1939	2005	2006												
CMP	223	252	258	265	274	283	290	297	304	306	316	322	328	390	420
	423	473	505	521	539	548	550	589	623	631	675	678	686	740	749
	805	826	898	908	1004	1009	1072	1182	1192	1203	1263	1353	1356	1426	1445
	1486	1492	1525	1786	1848	1893	1945	1954							
CMPB	1857	1862	1864	1873											
COM	1038	1210													
DEC	206	385	438	677	792	1084	1266	1284	1301	1305	1878	1924			
ENT	230	237	249	255	261	271	280	285	294	301	313	319	325	338	348
	446	980	1015	1068	1080	1089	1098	1109	1226	1256	1398	1464	1541	1607	1704
	1807	1831	1848	1896	1947	1959	2001								
HALT	34	232	1117	1126	1133	1237	1408	1543	1603	1653	1840	2009	2016		
INC	475	504	547	597	600	636	639	680	688	716	727	814	884	986	1039

	1181	1211	1355	1370	1531	1534	1664	1666	2023					
IOT	862	873	888	943	950	959	1571	1587	1640	1691	1698			
JMP	46	55	61	65	68	71	74	77	81	85	88	94	98	102
	110	114	118	122	247	352	476	479	646	906	990	1024	1118	1593
	1706	1813												1610
JSR	216	233	251	257	263	273	282	287	296	303	315	321	327	344
	386	411	440	442	469	516	534	543	586	620	628	671	682	713
	737	745	754	789	802	810	822	831	850	854	855	883	894	895
	925	937	955	963	964	968	972	976	1020	1060	1064	1076	1085	1094
	1218	1222	1231	1252	1365	1374	1378	1383	1388	1394	1453	1460	1561	1575
	1609	1631	1644	1657	1685	1702	1799	1803	1812	1819	1823	1827	1837	1860
	1883	1885	2014											1866
MOV	203	204	208	209	214	215	241	267	292	293	299	309	340	366
	368	369	374	382	383	384	398	399	400	401	408	409	410	415
	426	428	429	430	436	437	439	441	457	459	460	466	467	468
	500	501	502	503	507	514	515	519	532	533	537	541	542	575
	578	584	585	611	612	618	619	625	626	627	657	658	659	661
	664	669	670	674	681	699	700	701	703	704	705	711	712	722
	728	729	735	736	742	743	744	751	752	753	774	775	776	777
	779	781	787	788	793	794	800	801	807	808	809	820	821	828
	830	848	849	851	852	853	858	864	868	869	875	879	882	890
	918	919	921	922	923	924	928	929	932	934	935	936	938	945
	954	961	1002	1006	1018	1030	1031	1032	1035	1036	1037	1040	1041	1043
	1062	1070	1074	1083	1093	1102	1114	1136	1149	1156	1157	1186	1188	1200
	1209	1212	1214	1250	1260	1261	1262	1265	1277	1278	1279	1298	1300	1303
	1351	1352	1366	1367	1371	1382	1387	1392	1422	1423	1439	1442	1451	1457
	1482	1488	1489	1490	1502	1504	1508	1510	1511	1518	1520	1521	1523	1526
	1528	1539	1560	1565	1566	1567	1573	1583	1589	1602	1605	1606	1630	1634
	1636	1642	1652	1655	1656	1661	1678	1679	1680	1683	1684	1686	1687	1693
	1712	1716	1720	1724	1728	1733	1740	1741	1742	1743	1765	1766	1773	1774
	1781	1782	1847	1853	1855	1875	1890	1892	1912	1913	1914	1916	1935	1937
	1942	1962	1979	1980	1981	1982	1983	1984	1985	1986	1987	1990	1991	2003
	2012	2013	2019											2004
NOVB	1856	1870	1879	1882	1884	1919								
NOP	1021	1022	1023											
RESET	202	1663	1734	1735	2011									
ROL	243	244	268	269	277	278	311	418	1158	1159	1160	1161	1162	1163
	1165	1166	1167	1168	1282	1283	1424	1440	1443	1776	1777	1778	1965	1967
ROR	341	342	1008	1150	1151	1152	1153	1154	1251	1506	1509	1768	1769	1770
	1772	1921	1922	1923	1950	1951	1952	2022						1771
RTI	1044	1057	1128	1137	1529	1540	1545	1861	1895	1984	2015			
RTS	1148	1172	1217	1238	1269	1307	1361	1428	1447	1513	1668	1841	1881	1926
	1992	2024												1956
SUB	242	264	1123	1452	1458	1485	1496	1501	1505					
SWAB	1103	1775												
EXT	1522													
TRAP	29	30	31											
TST	217	228	288	380	406	434	464	512	530	582	616	667	709	720
	785	798	818	904	1058	1119	1267	1448	1491	1876	2007			733
TSTB	378	404	432	462	510	528	580	614	665	707	718	731	783	796
	1194	1532	1746	1784	1871	1940	1943							816
WAIT	865	876	891	946	953	962	1574	1590	1643	1694	1701			
.ASCII	2044	2048	2053	2056	2061	2064	2069	2077	2083	2088	2092	2097	2103	2109
	2122	2127	2130	2135	2139	2143	2146	2150	2156	2161	2167	2172	2179	2183
														2188

	2194	2198	2204	2208	2213	2217	2223	2224	2228	2229	2231	2235
.ENABL	7											
.END	2248											
.EVEN	143	1318	2043	2239								
.LIST	5	34										
.NLIST	5	34										
.REPT	34											
.TITLE	2											

ERRORS DETECTED: 0

MAINDEC-11-DZRFB-B
DZRFBB.P11

PF11 DATA TEST REPLACES D50A

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*DZRFBB,DZRFBB/SOL/CRF_DZRFBB
RUN-TIME: 6 14 3 SECONDS
CORE USED: 8K